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Essays in Fiscal Decentralisation and Fiscal Consolidation

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Introduction and Plan of Research

Recent discussions on the appropriate levels of decentralisation in many countries, including the UK, coupled with the growing importance of supra-national authorities such as the European Union has re-ignited the debate regarding fiscal policy conduct over a number of tiers of government. Throughout both the developed and developing worlds, there is now a substantial academic and public policy literature that discusses the merits and de-merits of alternative levels of expenditure responsibility and financial autonomy available to each governmental tier. While this literature has been largely normative in nature, in more recent years there has been a movement toward a more 'positive' approach.

However, within the fiscal decentralisation/federalism literature there has been surprisingly little cross-country empirical work examining the impact or implications of national fiscal policy being determined over a number of tiers of government. The vast majority of empirical studies have been limited to individual country studies. Even here, the literature is dominated by studies of the USA. While these single-country case studies have generated a good deal of useful information and plausible hypothesis, the applicability of such studies to other less decentralised countries is likely to be limited and cross-country studies have much to offer the literature.

The cross-country empirical studies that do exist tend to be of two types. Firstly, there are those which examine the impact of decentralisation on the size of

national government and secondly, those which examine the impact of decentralisation on the national growth rate. Both empirical studies are based on two key propositions from advocates of decentralisation: increased decentralisation can a) limit the size of government and b) increase the growth rate of a country. It is fair to say that the results from both literatures are inconclusive. The relationship between government size and decentralisation appears to be unclear[1]. For example, early studies such as Oates (1985) find no significant relationship between the two, while more recent studies offer conflicting results; Stein (1999) finds evidence of a significant positive relationship between decentralisation and government size in Latin America though in contrast, Rodden (2003) finds evidence of a significant negative relationship. Similar mixed results are obtained in examinations of the relationship between decentralisation and growth[2]. For example, Davoodi and Zou (1998) find a negative but insignificant relationship for developing countries and no significant relationship for developed countries. In contrast, Thießen (2003) finds evidence of an apparent non-linear effect within developed countries, with those with 'medium' levels of fiscal decentralisation associated with the highest growth rates.

The goal of this thesis is to offer a contribution to this cross-country empirical literature. In contrast to those studies outlined above however, we choose to focus on a more narrow aspect of national fiscal management; fiscal consolidation attempts. A fiscal consolidation attempt is defined as a large and discretionary attempt by a country/government to improve the fiscal position. Our aim is to examine the role of sub-central tiers of government and their relationship with the centre during such

[1] For an excellent survey see Oates (1999).
[2] For an excellent survey of both the empirical literature and the avenues through which decentralisation can impact on growth see Thießen (2003).

periods of budget adjustment, together with the more general implications of fiscal decentralisation on the consolidation process.

Governments' attempts to improve the sustainability of their fiscal balances have been at the forefront of fiscal policy discussion for more than a decade. In some countries such as Ireland, the consolidation effort has resulted in stabilised Debt to GDP ratios for the first time in a generation. Elsewhere, some previous bastions of fiscal prudence such as Germany and France are now struggling to maintain or regain sound fiscal positions. Lower interest rates have reduced debt servicing costs for the majority, but adherence to fiscal rules and the fiscal implications of ageing populations will ensure that the need to strengthen fiscal positions will remain a key issue in the years to come.

A substantial empirical literature has developed examining fiscal consolidations and some key policy conclusions have emerged. For example, following the work of Alesina and Perotti (1995) and McDermott and Wescott (1996), it is widely accepted that consolidation attempts based upon expenditure cuts are more likely to generate long-term improvements in a country's fiscal position than those based upon revenue increases.

However, throughout this literature, (see for example, Alesina and Perotti (1995) Alesina *et al.* (1998), McDermott and Wescott (1996) and Von Hagen *et al.* (2001)) the focus has been on general government data. General government is the

aggregate of central and sub-central tiers[3]. This has one clear advantage in that large and consistent data sets are readily available, but in our view, this advantage is outweighed by a key weakness. The approach implicitly assumes that governments behave as if a single authority exercises complete control over the size and composition of fiscal balances. In view of the substantial role played by sub-central governments in the conduct of fiscal policy, we believe that it is worth extending this literature to look at the distinct contributions made by sub-central and central government and examine how these tiers of government interact during consolidation attempts.

The size and responsibilities of sub-central tiers of government differ markedly across countries. In many countries with a federal structure e.g. the USA, Austria, Germany and Canada, sub-central legislatures have considerable political power and sizeable spending and financing responsibilities relative to the central/federal tier. In Canada, for example, data from IMF Government Financial Statistics indicate that over 50% of total government expenditure is conducted by sub-central tiers.

In unitary countries it is often assumed that fewer responsibilities are devolved to lower tiers of government, although it does not necessary follow that their role in fiscal policy is insignificant. Many unitary countries have in fact devolved considerable fiscal responsibilities. For example, IMF figures indicate that in 1998, sub-central government expenditure was 44% of the general government total in Denmark. Even in the UK, still a relatively centralised country, this figure was 22%.

[3] General government is defined by the OECD as "all departments, offices, organisations and other

Financing responsibilities also vary, with at least some countries avoiding passing on major revenue raising responsibilities. It is relevant to ask whether the central tier retaining control over financing obligations makes fiscal consolidation attempts more or less likely to succeed.

Thus the aim of the thesis is to offer a contribution both to the decentralisation literature and the fiscal consolidation literature. An outline of the thesis is provided below.

Outline of the Thesis

In Chapter 1 we begin with a discussion and survey of the extent and format of decentralisation in our sample countries. The primary motivation for this Chapter is to provide an overview of the key issues of decentralisation and to discuss current developments in the literature. In addition to discussing the arguments for and against fiscal decentralisation, our cross-country comparative study allows the reader to gain an insight into countries' different approaches to decentralisation. We are able to demonstrate that while most countries have substantial elements of fiscal decentralisation, important differences are evident not just in the level of sub-central involvement in fiscal policy conduct, but also in the type of expenditures and taxation that these units control.

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bodies which are agencies or instruments of the *central, state or local public authorities*", OECD (2002).

Chapter 1 highlights a key issue that recurs throughout the remainder of this thesis: the form of sub-central finance. In practice, sub-central expenditures can either be financed from revenues raised by the sub-central units themselves or by inter-governmental transfers. It is apparent that considerations of inter-regional equality and central government control result in significant levels of central transfers. By far the biggest central transfer is the grant system though in countries such as Austria and Germany, tax-sharing arrangements also play an important role. The issues of intergovernmental transfers and the contrasts between grants and tax-sharing arrangements are important points of discussion which we return to on numerous occasions.

In the main, the remainder of the thesis focuses primarily upon fiscal consolidation attempts and Chapter 2 is devoted to a discussion of the methodology used to identify such episodes. In an ideal world, it would be possible to focus on episodes when we know for certain that a government/nation had embarked on a deliberate discretionary attempt to improve their fiscal position. However in practice, such information is unavailable and it is necessary to rely upon movements in data to determine ex post, when consolidation has taken place.

In common with the existing literature we define a fiscal consolidation as a discretionary attempt to improve government fiscal balances. In what follows we analyse both general government and sub-central government attempts at fiscal consolidation. In order to focus on discretionary policy actions it is necessary to abstract from the effects of automatic stabilisers and interest payments. This leads us to focus on changes in the structural primary balance as a proportion of GDP. While

both adjustments are deemed appropriate how one adjusts for the economic cycle is controversial[4].

As yet, there is no universally accepted technique for decomposing the ratio of the primary balance to GDP into its cyclical and discretionary components. Much of this Chapter is therefore, devoted to this issue and the attainment of an appropriate method to isolate discretionary fiscal policy upon which the subsequent analysis is based. We have chosen to adopt the Blanchard Fiscal Impulse (BFI) measure as it is transparent, robust and appears to generate results that accord with the consensus of stylised facts. In addition, much of the previous consolidation literature has employed the BFI, so by following this lead, the comparability of this work and the value added of this thesis can be readily observed.

In addition, we discuss the methods we employ to identify and measure the success of consolidation attempts. Again, we outline a number of possible approaches in addition to our preferred options. Our approach, which mirrors that of the current literature, measures success by observing the post-consolidation performance of the debt to GDP ratio. Again, we have chosen this approach in order that the value added from our results over the existing literature can be clearly observed. For both our techniques of identification and classification of consolidation we demonstrate the robustness of our analysis to alternative methodological approaches.

Having outlined our measure of discretionary fiscal policy, Chapter 3 begins

[4] Interest repayments reflect earlier borrowing and are affected by chagnes in monetary policy and have little to do with current fiscal policy.

our formal empirical analysis of fiscal consolidation attempts. In line with Alesina and Perotti (1995 and 1997), Alesina *et al.* (1998) and McDermott and Wescott (1996), we adopt a descriptive approach and examine the size and composition of general government consolidations by measuring the average change in the adjusted deficit and components of expenditure and revenue during such adjustments. In doing so, we are able to discriminate between successful and unsuccessful consolidations and compare and contrast the changes that appear conducive to success. However unlike the existing studies, this chapter's primary point of interest involves examining the distinct contributions of both the centre and the sub-centre to consolidation.

Our methodology is based upon calculated averages and t-stats and it is this simplicity which is the major advantage of our analysis. We also construct a novel, more refined measure of success and in doing so, we are able to observe interesting features of successful and unsuccessful consolidation attempts that have been previously overlooked. By focussing on descriptive contemporaneous changes in fiscal policy, we are able to clearly identify the alternative characteristics of successful and unsuccessful fiscal adjustments. In addition, our approach offers a previously unexplored insight into the distinct contribution of the sub-central tier and of their interaction with the centre during consolidations. We believe that this extension of the literature to account for the separate contributions of central and sub-central tiers separately, offers an important step forward.

To summarise our key results, we find that during national consolidation attempts, sub-central governments do in fact play a key role, especially in successful attempts. We also verify a result from the existing literature that successful

consolidations tend to be based upon expenditure cuts as opposed to increases in revenue and demonstrate that this result holds at both central *and* sub-central tiers. Indeed the majority of consolidations involve shared effort across both tiers of government. This is especially important with regard to the wage bill. Previous studies have stressed the importance of tackling the government wage bill during consolidation and we are able to demonstrate that the involvement of sub-central tiers of government is crucial to achieving such cuts. However, our results also demonstrate that a consolidation attempt is less likely to be successful if the relative brunt of the consolidation effort is skewed toward the sub-central tier.

On numerous occasions we observe that central governments exert a strong influence on the expenditure of sub-central tiers through their grant allocations. Changes in these allocations essentially 'force the hand' of the sub-central tiers to adjust expenditures and have a considerable impact upon the outcome of consolidation attempts.

An apparent downside is however revealed in the analysis of the composition of expenditure in that there is a bias toward cuts in local/regional public investment programs. This result is especially evident when focus is directed from general to sub-central government consolidation attempts. For example, when sub-central governments consolidate, without any similar adjustment at the centre, the vast majority of the adjustment to sub-central expenditures is borne by capital investment. This bias toward cuts in capital expenditure represents a genuine cause for concern, given the long-term implications for local service provision.

While Chapter 3 is able to offer an important insight into the role of sub-central tiers during consolidation attempts, the primary limitation with the methodology adopted here and in the fiscal consolidation literature in general, is the restriction of the analysis to the period of actual adjustment. Little is known about fiscal policy behaviour both before and after consolidation. For example, we are unaware whether consolidation attempts appear to follow periods of expansion or more limited contraction and/or whether any reforms made in the period of consolidation are sustained. In Chapter 4 therefore, we extend our descriptive analysis so that we can observe changes in fiscal policy both in the period of consolidation and in surrounding periods.

To undertake this analysis we conduct an event study. This methodology is popular in the Finance literature but is less widely observed in macroeconomics. In our context however, we argue that event analysis methods are highly applicable and can offer some important insights. The methodology we adopt enables us to conduct a natural experiment to capture the difference between fiscal behaviour during both the period of consolidation and surrounding years with 'normal' (i.e. non-consolidation) years. While the methodology has been adopted elsewhere in Tornell and Westermann (2002), its application to fiscal consolidations is novel.

In addition to examining episodes of consolidation, in Chapter 4 we also extend our analysis to examine the response of sub-central governments to periods when their grant allocations are cut. This enables us to examine the extent to which sub-central governments adjust expenditures and use their own fiscal powers (where these are significant) to offset the cuts in grants. The literature on central government

grant allocations and the associated 'flypaper' effect has largely been limited to studies that use USA data, while any non-USA studies have been limited to individual country case studies – see for example Gramlich (1977), Hines and Thaler (1995) and Moisio (2003). Our analysis in this section of Chapter 4 is therefore, an important step-forward as we are able to conduct what we believe to be the first study of grant cuts on a cross-national basis.

In summary, while verifying the key conclusions of the previous chapter a number of additional results are obtained in Chapter 4. For example, we verify that successful fiscal consolidations bring with them similar *and sustained* cuts in expenditure at the sub-central level with grants playing an important role in 'forcing the hand' of the sub-centre. In contrast, unsuccessful consolidations tend to be driven by short-term revenue increases – i.e. higher revenues in the period of consolidation followed by cuts in the immediate aftermath.

In our event study of grant cuts, our results shed some light on how sub-central governments react to cuts in grants and thus, at least indirectly, on the 'flypaper' effect, by showing that it operates in reverse. Not only do sub-central governments react to a cut in grants by cutting expenditures, but remarkably those countries with structures which are more decentralised and apparently involve greater fiscal autonomy tend to cut expenditures by more, and seem reluctant to raise sub-central taxes. This reverse 'flypaper' effect might highlight either a low degree of effective fiscal autonomy, or a high effective degree of tax competition at the sub-central level which prevents any offsetting increase in local taxation.

Furthermore, by grouping countries using country characteristics in our event analysis regressions, we can examine whether particular patterns of reaction to fiscal consolidations or cuts in central government grants are particularly applicable to certain individual or groups of countries. We find for example, that coalition governments appear less willing to cut sub-central grant allocations in periods of fiscal consolidation. This is consistent with the political economy belief that the type of government can be an important determinant of fiscal policy conduct within a particular country.

In Chapter 5 we change tack slightly and discuss the implications of alternative sub-central financing regimes on the ability of the centre to influence sub-central and hence national fiscal policy. One weakness with standard public finance databases such as the OECD's Revenue Statistics and the IMF's Government Finance Statistics is that they are likely to overestimate the extent of sub-central financial autonomy by attributing all taxation revenue received by the sub-centre as 'own-source'. In many countries, significant tax sharing arrangements exist and while the sub-centre 'receives' these tax revenues they have little or no control over how they are raised. As evident from OECD (1999), under most tax sharing regimes the central and sub-central share of the total pool of revenues raised from shared taxes is fixed either by the constitution or by some previously mutually agreed means-tested formula. However, even though the tax 'shares' each tier receives are fixed, the centre retains full control over the base and the rate of this commonly shared revenue source. Therefore, it has been argued in the recent literature, see Rodden (2002), Pola (1999) and Ebel and Yilmaz (2002), that such revenues are in effect a central transfer and should be classified in an identical way to grants.

However, in Chapter 5 we outline, via a stylised budgetary accounting framework, that there are important differences between grants and the most common form of tax sharing arrangement. These differences lead to a clear distinction in the extent of 'effective' central control over sub-central fiscal policy. In essence, under a system of grant finance, the centre is able to manipulate sub-central fiscal policy in a manner that is akin to full centralisation. By altering annual grant allocations, the centre is able to 'force the hand' of the sub-centre to consolidate. In contrast, under a system of tax sharing, provided that the tax shares received by each tier are fixed or require the consent of both tiers before alteration, the level of central control is in fact more akin to that under full decentralisation. In this scenario, the centre is unable to 'force the hand' of the sub-centre and the degree of 'effective' control is significantly more limited.

We believe that this result has important implications at both the policy and academic levels. While both tax sharing and grants represent a reduction in sub-central financial autonomy relative to full tax autonomy, the degree of effective central control is higher under a system of grants than under tax sharing. Therefore, switching from grant finance to tax sharing, contrary to established thinking, represents a substantial loss in central effective control. On the academic front, this result implies that despite the recent trend in the literature, it is inappropriate to classify grants and tax sharing arrangements as equivalent sources of intergovernmental transfer. Although both involve a transfer of resources, the relative ability of the centre to control these transfers differs substantially.

Finally, while Chapters 3 and 4 examine the role of sub-central governments during national consolidation attempts, in Chapter 6 we explicitly test whether the degree of decentralisation impacts on the nature and ability of a country to undertake a successful consolidation. In doing so, we aim to shed light on an important concern of the decentralisation literature by testing whether higher levels of decentralisation lead to a loss in macroeconomic control. While the political economy literature has assessed the relative impact of different types of government and budgetary institutions on the ability of a country to implement a successful consolidation, the role of decentralisation has so far been ignored. This is surprising as the literature has stressed the importance of political fragmentation during budget negotiations on fiscal outcomes and it would seem plausible that at a first glance, similar fragmentation can exist when national fiscal policy decisions are conducted across tiers of government.

At the outset, prior to any empirical analysis, we discuss in detail the construction of our measures of decentralisation which we use to capture differences in the relative power of sub-central authorities. We construct two measures, one based on the level of fiscal decentralisation and the other on the level of sub-central political autonomy. Both measures we believe are as accurate as possible using current data and provide good approximations of the level of decentralisation within our sample countries. From this, we are able to test directly whether the degree of decentralisation impacts on consolidation attempts. Our approach again focuses on both the composition and the success rates of consolidation attempts and assesses the impact of decentralisation on both of these outcomes.

In conducting our analysis of the composition (i.e. the extent of the adjustment to expenditure and/or revenue) of our identified consolidation attempts, we initially adopt standard OLS/SUR analysis although such an approach can be influenced by cross country differences in the size of government. A method which circumvents this problem and has a number of other additional advantages is to employ limited dependent variable (LDV) analysis. In this chapter we use both binary and ordered dependent models. While binary models have been used in the existing literature, we believe that the use of an ordered model is unique. A similar approach is adopted in our analysis of success. In both the analysis of composition and success, we include a number of economic and political 'control' variables to obtain a full understanding of the factors contributing to both the reliance upon expenditure or revenue adjustment and its ultimate long term outcome. For example, in addition to measures of the output gap and the monetary stance, we also account for the 'type of government' at the centre during consolidation and examine the extent to which single party, coalition, minority, right and left wing governments consolidate differently from each other.

The results from this chapter suggest that while decentralisation does appear to have a limited impact on the composition of a consolidation attempt, it is unclear if this is sufficient to generate a significantly lower probability of success. In our analysis, we find that countries with higher levels of decentralisation typically base their consolidation attempts on revenue increases as opposed to expenditure cuts. We interpret this result as consistent with the hypothesis that political fragmentation in the budgetary setting process can skew the consolidation attempt toward the less politically 'sensitive' elements of fiscal policy. However, we find that in a direct test

of whether or not increased decentralisation lowers the probability of a successful consolidation, having accounted for various political and economic controls, our measures of decentralisation tend to be insignificant. This result suggests that at a first pass, decentralisation does not lead to a significant loss of general government fiscal control.

One issue, which we discuss in detail in Chapter 6, is the attainment of an appropriate measure of decentralisation for each country in our sample. While we believe that the methods we have applied are a significant improvement on previous studies, further advancements are possible. However, attaining these will require additional data and information which as yet, is unavailable. In the final section of Chapter 6 we outline some important measurement issues and potential avenues for future research. This is an aspect I wish to advance in post-doctoral studies.

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Chapter 1

"Fiscal Decentralisation: A Discussion of the Literature and Cross-Country Experiences[1]"

1.1. Introduction

The issue of fiscal decentralisation has become of paramount importance for many countries in recent years. Throughout both the developed and developing worlds, there is now a substantial academic and public policy literature that discusses the merits and de-merits of alternative levels of expenditure responsibility and financial autonomy available to sub-central governments. In some countries, such debate has led directly to fiscal reforms. The recent first wave of devolution in the UK for example, represents one of the most fundamental changes to the UK Constitution in over a century. The UK has not been alone in undertaking or contemplating increased sub-central fiscal responsibility and similar issues are being discussed in France, Spain and Italy.

In many instances, discussions regarding the appropriate level and form of decentralisation are motivated by political concerns. In Spain for example, increasing the fiscal powers of the Autonomous Communities (ACs) was seen as an essential part of the democratisation process. In others, including the UK, decentralisation has

[1] We would like to thank participants at the *Scottish Affairs* Seminar on Scottish Devolution and to J Mønnesland for extensive comments on an earlier version of this Chapter.

been a response to pressures from regional/national groups for more participation in and control of the political process. At the extreme, sub-central devolution can represent an attempt to keep a country united in the face of such pressures either by granting greater autonomy to all regions, or, as in Spain, Italy and the UK, by forging asymmetric devolved powers.

Political decentralisation refers to the transfer of formal political power from 'higher' levels of government to 'lower' level government. In contrast, fiscal decentralisation concerns the transfer of financial resources and responsibility for the provision of certain goods and services from 'higher' to 'lower' levels of government. Clearly there is considerable overlap between political and fiscal decentralisation and it is virtually impossible to completely separate political and economic factors. However, the focus of this thesis is primarily upon the economic aspects of fiscal decentralisation and discussion will therefore be primarily restricted to this area. Nevertheless and where appropriate, acknowledgement and analysis of relevant issues from the political science literature will be made.

In order to analyse the role and implications of fiscal decentralisation for national fiscal consolidation attempts it is, at the outset, necessary to provide a summary of the key issues previously highlighted in the fiscal decentralisation literature. This chapter aims to discuss such issues by adopting a two-strand approach. Firstly, we summarise the levels and forms of fiscal decentralisation in our OECD sample countries and compare and contrast the fiscal arrangements adopted. We demonstrate that while most countries have substantial elements of fiscal decentralisation, important differences are evident not just in the level of sub-central

involvement in fiscal policy conduct, but in the type of expenditures and taxation that these units control. In addition, we show that the degree of borrowing autonomy and central government control/influence over the sub-centre also differs quite considerably across countries. Secondly, in examining cross-country experiences we also draw on the established literature to discuss the advantages and disadvantages of alternative decentralisation structures.

At the heart of much of our discussion lies the fact that, while there are many persuasive arguments for decentralising substantial elements of government expenditure to sub-central tiers, the financing of these arrangements is less clear. Concerns over equality, administrative complexity, economies of scale, transparency, macroeconomic stability and reliable revenue flows tend to favour centralised revenue collection and consequently, various forms of central control over sub-central finances. As our analysis shows, most major taxes are typically assigned to central governments. Thus, there is an inherent imbalance between on the one-hand expenditure assignment and on the other revenue assignment. This observation is of key importance in future chapters.

The structure of the chapter is as follows. In Section 1.2 we introduce the dataset that is used throughout the thesis. Section 1.3 reviews the theoretical arguments for and against the decentralisation of spending responsibilities. In addition, we provide a cross country comparison of the extent to which spending powers have been devolved in the countries in our sample, putting each country's position into a wider context. In Section 1.4 we shift focus toward the revenue side. In doing so, we review some insights from the theory of fiscal federalism on fiscal

autonomy and assess the actual extent of sub-central revenue autonomy for the countries in our sample[2]. Revenue decentralisation tends to be more complex than expenditure decentralisation with greater scope for variation between nations. Consequently much of this chapter is devoted to this issue. Section 1.5 concludes.

1.2. Data

Throughout this thesis the primary source of data is the International Monetary Fund's Government Finance Statistics (GFS), 2002 Edition. In addition, we supplement this with data from the OECD Statistical Compendium, 2002 Edition. GFS provides the best internationally comparable data on fiscal variables across OECD countries disaggregated by tier of government. International comparability is the great strength of the GFS database. Unlike general government fiscal data, separate fiscal data on central and sub-central expenditures and revenues is difficult to find. While it is possible to obtain fiscal data on an individual country basis, in most cases, given differences in measurement and accounting, such data is not comparable. The GFS presents fiscal data for central, state and local authorities for a number of countries which is directly comparable. For the most part, in federal countries we combine state and local authority fiscal data to obtain an aggregate measure of sub-central fiscal policy. The data is annual.

[2] In the UK, the academic and policy debates have typically termed discussions regarding revenue autonomy as fiscal autonomy. In other circles, fiscal autonomy is used to refer to both expenditure and revenue autonomy. In this thesis we adopt the UK definition so that discussions regarding decentralisation of revenue responsibility are referred to as fiscal autonomy.

GFS allows one to examine individual components of fiscal policy in addition to aggregate measures. Thus, we are not only able to examine total expenditures, total revenues and aggregate deficits, but in addition we can differentiate expenditures according to economic type (e.g. social transfers, wages etc) and function (e.g. defence, health care etc), while revenues can be disaggregated according to taxation (direct and indirect), fees and user charges and inter-governmental grants. Therefore, the GFS database provides an invaluable source of central and sub-central government data upon which cross-country analysis can be carried out. While alternative sources such as the OECD's Revenue Statistics contain similar data on total revenues and expenditures across tiers of government, they do not provide as precise a decomposition of such aggregates. The use of the GFS database is therefore highly advantageous in our analysis of how tiers of government consolidate.

Given data constraints, we restrict our focus to fifteen countries which includes both unitary and federal countries. Within these fifteen countries the sample periods differ within the range 1970 - 1999. The countries examined, together with their respective sample periods are listed in the following table.

Table 1.1: Sample Periods

Country	Start data	End date	Country	Start data	End date
Australia	1980	1998	Ireland	1970	1997
Austria	1970	1994	Netherlands	1975	1997
Belgium	1978	1998	Norway	1980	1998
Canada	1979	1999	Spain	1980	1997
Denmark	1977	1999	Sweden	1978	1999
Finland	1972	1993	UK	1970	1998
France	1978	1997	USA	1980	1999
Germany	1974	1998			

A description of the data is provided in an Appendix.

Although we believe this dataset is ideally suited to our research, it does have some weaknesses which must be recognised. An obvious one is that little or no distinction is made between revenues from taxes, where the sub-central tier control both the tax rates and/or the tax base and revenues from tax-sharing arrangements. The GFS classifies all taxation revenue received by sub-central tiers as being 'own-source'. Many countries, including Norway, Germany and Austria make extensive use of tax-sharing arrangements. Tax-sharing arrangements exist when both the centre and the sub-centre receive revenues from the same source. The level of sub-central influence over such shared tax revenues varies both by country and type of tax. In many instances, sub-central authorities have very little autonomy to alter the revenues they receive from such taxes and hence it is arguably more appropriate to interpret such revenues as transfers rather than 'own-source'.

Information on such shared revenues has been difficult to find, although a recent study OECD (1999) has made progress in this area. The OECD (1999) study was the first to explicitly differentiate sub-central taxation revenues into those where sub-central tiers have full autonomy and those that are shared with the centre. The study also measures the ability of sub-central tiers to alter the rate and base of the shared taxes. In the analysis that follows, we have been able to take into account this additional information.

Another potential weakness is the extent to which central government can exert influence on sub-central spending patterns through directives (see Pola (1999) and Ebel and Yilmaz (2002)), GFS will overstate the true nature of sub-central expenditure autonomy.

To the extent that central governments continue to be seen, or see themselves, as accountable to their electorate, they may fear the consequences of any deterioration in standards of provision following decentralisation, prompting the response of explicit directives. Areas such as health and education are common examples in which central government direction goes beyond simple guidance. In such circumstances sub-national governments should be seen not as independent providers of public services, but as local agencies implementing central government policies, see Tanzi (2001). Unfortunately, where directives are used, the GFS data will overestimate the true extent of fiscal decentralisation.

Obtaining an accurate cross-country comparison of the extent and significance of directives and central government influence is likely to be problematic. Ebel and Yilmaz (2002) have conducted some very preliminary analysis for a small selection of Eastern European countries in one particular year, but such studies are very much in their infancy. Nevertheless, despite these caveats the GFS remains without question the best available internationally comparable dataset for our purposes and we have chosen this as the primary source of data in the analysis that follows.

1.3. Expenditure Decentralisation: Motivation and Cross-Country Experiences

Every country in the developed world assigns some elements of national government expenditure to sub-central tiers of government. Expenditure decentralisation occurs when units of authority, other than the central government, are responsible for the provision of certain government services. While the type of expenditure assigned to sub-central tiers tends to be similar across countries, the actual level and degree of responsibility for particular types of national government expenditure differs considerably. We begin with a discussion of the benefits and costs of alternative levels of expenditure decentralisation before examining the cross-country evidence.

1.3.1. Theory

The economic theory of decentralisation draws on contributions by Tiebout (1956), Musgrave (1959) and Oates (1972). An excellent overview is provided in Oates (1999)[3]. There is broad agreement that central government should have responsibility for macroeconomic stabilisation, overall redistribution, and for functions providing clear collective benefits or spillovers (such as national defence, international relations and research and development). However, a key presumption made by proponents of decentralisation is that centralised provision in other areas can be too uniform and relatively inflexible in the face of potentially diverse regional preferences and needs. Decentralisation can aim at increasing the role of those with

[3] Many of the arguments here relate to both expenditure and revenue decentralisation and will be repeated in Section 1.3.

greater knowledge of local preferences so that fiscal decisions made at the sub-national level better reflect regional diversity.

Given regional diversity, Tiebout's (1956) model of revealed preference predicts that consumers will choose to locate in jurisdictions that provide the mix of public services that maximise their welfare. The intention is that citizens who are dissatisfied with the pattern of provision in their area can, if they wish, move to areas where the pattern suits them best. Therefore under certain assumptions, diversity of provision combined with consumer mobility can lead to pareto optimal provision.

This idea is driven by the 'benefit principle' which states that a given service should be provided by the level of government that most closely represents the region that benefits. From a traditional textbook perspective the gains are obvious. Underlying the optimal provision of a public good is the condition that the sum of the marginal rates of substitution for a public good, vis-à-vis a basket of private goods, should equal the marginal costs of producing an extra unit of the public good. To the extent that marginal rates of substitution (and to a lesser extent marginal costs) differ between regions, this efficiency condition requires different levels of public good provision between regions in order to marry the heterogeneous preferences of each region with marginal cost.

In many respects the concept of 'subsidiarity', as proposed in the Maastricht Treaty and reasserted in the Amsterdam Treaty through the notion of bringing decisions as close as possible to the citizen, relates closely to this concept of efficiency in public service provision. Recently, this has received further impetus,

both within individual EU states and from the EU's Committee of the Regions. An additional benefit of bringing decisions closer to citizens is that this may promote their involvement in the democratic process, see for example, Tanzi (2001).

The greater sensitivity of sub-central governments to local preferences, may enhance the ability of the provider to identify both recipients and citizens' willingness to pay[4]. It is argued that individuals will be more willing to pay for services that they find to be responsive to their priorities, especially if i) they have been involved in the decision making process, and ii) costs are clearly perceptible in that process. In short, decentralisation may result in a closer approximation to the efficient solution of provision to the point at which the marginal costs and benefits of provision are equated.

Theory also has something to say about the optimal size of sub-central governments. Oates' (1972) classic work on fiscal federalism suggests that jurisdictions should be designed, and the assignment of public expenditures should be carried out, in such a way that provision is the responsibility of the jurisdiction representing the smallest possible area over which the benefits are distributed. The notion is to combine the most efficient allocation of public goods whilst avoiding taste differences (Atkinson and Stigilitz 1980). Complete compliance with this principle would suggest that different services would be associated with jurisdictions of different optimal sizes. Obviously other inefficiencies would result from a multiplicity

[4] The demand revelation problem is a well-recognised issue in public economics. While the market determines the exact quantity of private goods in equating supply and demand, no parallel mechanism exists for public goods. Instead, policymakers are required to assess desired levels of supply of each good, given costs of supply and perceived public preferences.

of tiers of government, but the key principle is that the size of the sub-central tiers should be chosen to be suit the broad range of services provided.

Finally, it has been suggested that decentralisation can foster innovation, in that diversity may result in greater experimentation and innovation in provision, and additionally provide valuable information about potential improvements in policy design, e.g. through piloting new approaches. In conjunction, a necessary feature must then include some mechanism/forum for cross regional sharing of ideas/findings.

While the above 'normative' arguments suggest possible benefits from decentralisation there are also a number of potential 'positive' benefits. Perhaps the most famous relates to the possibility that decentralisation itself may impact on the actual size of government. A large literature has evolved on the ability of sub-central governments to act as a constraint upon central government 'Leviathans'. Brennan and Buchannan (1980) have argued that politicians at the centre have a motivation to maximise the size of government beyond the level that is most efficient and in doing so, they create a 'Leviathan'[5]. By devolving fiscal responsibility away from the centre, it is possible that this incentive effect can be curbed as under decentralisation, government's quest for rents and revenue is undermined by the need for jurisdictions to compete for mobile sources of revenue. Empirical evidence regarding the Leviathan is mixed. Initial studies such as Oates (1985) found no evidence and in fact, he was forced to conclude that the Leviathan appeared to be a 'mythical beast'. More recent work by Rodden (2003) provides evidence of a negative relationship between government size and decentralisation, provided that in addition to measuring

[5] This cynical belief on the behaviour of politicians is central to the Public Choice or Virginia school of public economics.

expenditure decentralisation, account is also made of the degree of revenue and borrowing autonomy[6].

Another branch of this 'positive' approach has been to examine the relationship between decentralisation and economic growth. As pointed out by Thießen (2003), the theoretical arguments of the impact of decentralisation on economic growth are ambiguous. For example, proponents of decentralisation argue that benefits from diversification of public goods in line with the Tiebout (1956) hypothesis, constraints on government size, improvements in productivity from more responsive and innovative sub-central governments, and better general governance can lead to improvements in economic growth. In contrast, opponents argue that the potential for increased macroeconomic instability, the likelihood of weak and corrupt local politicians and bureaucracy, the scarcity of 'good' local taxes and harmful inter-state tax competition may all serve to reduce growth. Given this, it is unsurprising that the empirical evidence is mixed. For China, Zhang and Zou (1998) find evidence of a negative relationship between decentralisation and growth though in a similar study for the USA, Xie et al. (1999) found no relationship. Similar results are obtained in cross country studies with Davoodi and Zou (1998) finding a negative though insignificant relationship while Thießen (2003) finds that for a group of high income countries, those with a 'medium' level of decentralisation are associated with the highest growth rates.

Of course, there are arguments that suggest limits should be imposed on the

[6] In fact, this result is entirely consistent with the original claim by Brennen and Buchannan (1980) which was that the overall size of the public sector "should be smaller, ceteris paribus, the greater the extent to which *taxes and expenditures* are decentralised".

extent of decentralisation of spending decisions. Some public goods are by nature inappropriate for sub-central tiers. These include 'national' public goods such as defence, foreign affairs etc. For such goods and services which are non-rival in consumption within an entire country and where there are significant economies of scale, it is efficient for provision to be restricted to the central level[7]. Furthermore, concerns about national economic stability and the ability of the central government, the ultimate guarantor of macroeconomic policy, to respond to unforeseen events, requires that they retain the ability to control sufficiently large levels of fiscal policy. A downside of expenditure decentralisation is that there is no guarantee that sub-central fiscal policies will be entirely consistent with those of the central government. For example, sub-central governments may wish to pursue a more expansionary policy strategy than the centre. Even if both agree on the 'stance' of fiscal policy, changes in the composition of sub-central expenditures can affect aggregate demand in ways which may run counter to the objectives of the centre. The issue of central control during macroeconomic adjustment is a key concern and one that we will return to on a number of occasions, especially in Chapters 5 and 6.

Decentralisation may also come into conflict with distributional/equality objectives. Central governments are likely to be concerned about issues of equality of access to public services and uniformity, or at least an acceptable minimum in standards of provision. To the extent that substandard levels of provision of certain public goods affect adversely the stock of human capital of the country, there can be significant efficiency costs from the decentralisation of these types of expenditures.

[7] In Finland, the local government system encourages shared programs between individual municipalities to gain from economies of scale. The obvious downside to this is a potential loss in transparency and accountability.

Such concerns are particularly strong in areas such as health and education, not least because electorates tend to perceive the accountability to lie with central government. Furthermore, the ability of sub-central governments to provide public goods and services to their residents may vary widely leading to undesirable social and political tensions.

To the extent that the economic arguments outlined above motivate shared responsibilities of central and sub-central tiers of government, there may be increased administrative complexity, lack of transparency and potential clashes in competencies. These disadvantages could easily offset potential benefits. Oates' work on optimal size of government suggests that centralised provision is appropriate in areas where economies of scale are pervasive. Areas where there are interregional spillovers also need to be considered carefully; whilst decentralised provision may still be feasible, this is likely to require compensating transfers.

There are a number of additional practical concerns with high levels of expenditure decentralisation that relate to institutional constraints. A commonly cited concern relates to the administrative capacity of sub-central governments and the competence levels of local politicians. A key question here is, are local politicians more or less competent than their national counterparts? If they are more competent, positive benefits from expenditure decentralisation can be realised while the opposite will hold if they are less competent. It is widely thought that the more able politicians/bureaucrats can be found at the central level. Ter-Minassian (1997) postulates that "overstaffing, poor technical skills and training of employees, and the inability to formulate and implement effective spending programs" characterises

many sub-central authorities worldwide. A related but more specific point, relates to the level of corruption at the sub-central level. Tanzi (2001) argues that this is likely to be especially important for developing countries, given the likelihood of less effective scrutiny from the media, international organisations etc and where regional dynasties are relatively more powerful. While this issue is likely to be less relevant in developed countries, a general concern throughout the OECD relates to the correlation between decentralisation and pork-barrel projects, that is local politicians granting specific local 'rewards' in return for political support.

In summary, with regard to the three traditional Musgravian functions of government, the pitfalls of expenditure decentralisation are related more closely to macroeconomic stability and redistribution, while the benefits involve gains in allocative efficiency.

1.3.2 Comparative Evidence: Expenditure Decentralisation

1.3.2a) Current levels of Expenditure Decentralisation

Typically, the macroeconomic literature tends to ignore the role of sub-central governments in national fiscal policy conduct. Tables 1.2 and 1.3 provide internationally comparable information from IMF Government Financial Statistics (GFS) on public expenditure by level of government across a number of distinct functions and over time. An obvious conclusion that can be drawn from these tables is

the substantial amount of government expenditure that is assigned to sub-central tiers of government. Even in the least decentralised countries such as France and the Netherlands, around 20% of total general government expenditure is undertaken at sub-central tiers, rising to around 50-60% in the large federations such as Australia and Canada.

Table 1.2: Sub-Central Government Expenditure by Function
(as a percentage of General Government totals for each category)

		Education	Health	Social Security and Welfare	Housing and Local Amenities	Public Order and Safety	Recr'nal and Cultural Services	General Public Services
Federal Countries								
Germany	1996	96	28	21	93	92	95	62
USA	1999	95	43	31	33	79	74	32
Australia	1998	72	48	10	77	87	79	64
Canada	2000	95	96	31	74	67	69	40
Austria	1994	72	23	9	25	3	60	31
Spain	1997	71	31	6	93	41	39	64
Unitary Countries								
Denmark	2000	46	95	55	33	13	45	29
Norway	1998	63	77	19	87	17	35	66
France	1993	37	2	9	82	28	17	26
N'lds	1997	33	5	14	79	25	17	39
UK	1998	67	0	20	41	52	35	22
Ireland	1997	22	48	6	70	100	N.A.	8

Source: IMF Government Financial Statistics, 2002 edition.

Notes:
1. Figures are given for the most recent year available, as noted in brackets after the country name.
2. For the federal states, the single sub-central government figure combines the totals at federal and local level. This provides a clearer comparison with unitary countries where only a single figure is available (even for countries that have a multi-tier system of regions, and local level government).
3. Spain is included with the federal countries above, although it is not strictly a federation. It is often referred to as 'Quasi-Federal' or 'Regionalised State' since the constitution does not include a federal distribution of powers and the Spanish Parliament can transfer legislative and executive functions without any statutory reform. See Russell-Barter (2000) for a more detailed typology of international forms of regional government.
4. Disaggregated data are not available for all European countries in GFS so Finland, Belgium and Sweden had to be excluded from this table.

Table 1.3: The Evolution of Sub-Central Government Spending since 1970
(Figures are given as percentages of General Government totals)

Federal Countries	**1970**	**1975**	**1980**	**1985**	**1990**	**1995**	**Latest**	
Germany	45	44	44	41	41	41	38	(1998)
USA	47	46	43	41	44	47	50	(1999)
Canada	61	58	58	56	56	57	59	(2000)
Australia	49	42	41	40	43	42	41	(1999)
Austria	30	32	31	30	30	31	31	(1998)
Spain	-	-	11	21	30	30	32	(1997)
Unitary Countries	**1970**	**1975**	**1980**	**1985**	**1990**	**1995**	**Latest**	
Denmark[1]	44	47	48	43	44	44	46	(2000)
Sweden	45	44	40	37	37	31	34	(1998)
Norway	38	40	33	33	32	32	33	(1997)
Finland	38	38	39	40	41	34	36	(1998)
France	17	17	16	16	18	18	17	(1997)
Belgium[2]	-	-	14	12	11	11	11	(1997)
Netherlands	-	27	25	26	23	24	22	(1997)
United Kingdom	30	30	26	24	25	22	22	(1998)
Ireland	27	28	27	25	23	24	25	(1997)

Source: IMF Government Financial Statistics, 2002 edition.

Notes:
1. For Denmark a figure for 1972 has had to be substituted for 1970.
2. Belgium has effectively moved from a unitary structure to a federal structure. However, whilst the OECD provides some information for all three levels of sub-central government in Belgium (local government, communities and regional government), to date the GFS has kept its disaggregation to central and local government where it appears that the federal layer has been included with the centre. To this extent, the above figures understate the true extent of devolved spending in Belgium.

The distinction between unitary and federal countries is perhaps more apparent than real. While some federations have assigned major welfare (health, education and social welfare) functions to sub-central jurisdictions, others have not or they retain central control over some key functions (e.g. health in Germany and France and social security in all cases except Denmark).

As one would expect, the large federations, the USA, Canada and Australia have large levels of expenditure conducted at the sub-central level. In addition,

however, some unitary countries, for example the Scandinavian countries, have extremely devolved systems. In Sweden for example, municipalities and counties undertake 35% of public sector spending, with medical care assigned mainly to county councils and education (up to secondary schooling) mainly municipalities – see European Communities (2001).

The figures show that Denmark has the most devolved system among the unitary countries, dating back to progressive reforms that began in 1970 and proceeded through that decade. The devolved responsibilities extend to the provision of a broad range of services, from primary education to care of the elderly and to the distribution of benefit payments. Daugaard (2002) argues that the pursuit of administrative efficiency, the ability to target services at recipients and political arguments such as the strengthening of local democracy, have been important factors motivating this strategy. However, while Denmark is unusual in channelling social transfers through local governments (see Table 1.2), the central tier remains the main payer as refunds are paid from central to sub-central governments. In reality the situation is the same as if the state handled benefits through their own local agencies. The incentives for efficiency gains e.g. through better targeting of benefits to recipients are therefore unclear.

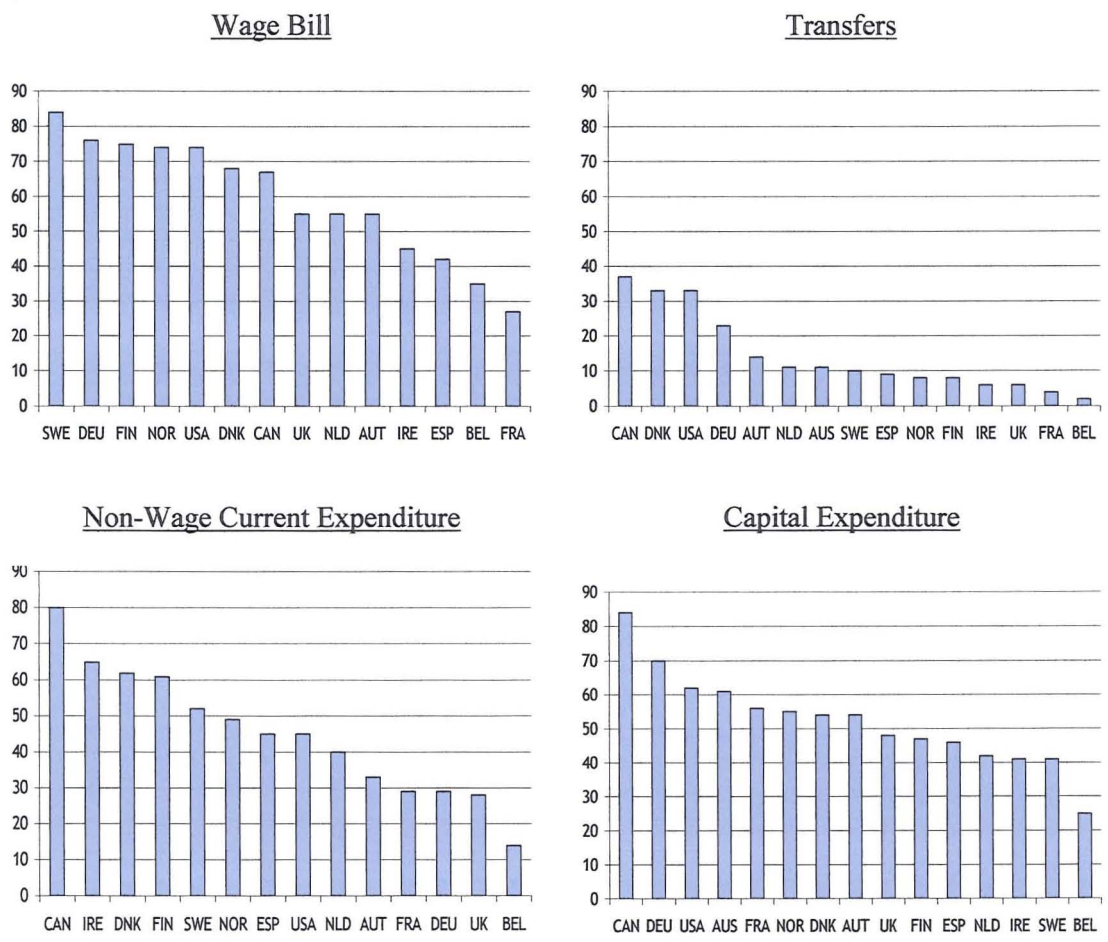
Interestingly, there exists substantial cross-country differences with regard to expenditure decentralisation by economic function. Though omitted from Table 1.2, all countries have assigned around 100% of all defence expenditure to the central government. Social security is also primarily the responsibility of the centre, the exception being Denmark as discussed above. In other areas of expenditure, such as

health care, education etc, there is greater evidence of shared competency. However, the tier of government which has the greater responsibility over expenditure delivery in such 'shared' expenditures, differs considerably across countries. For example in Germany, while sub-central authorities have, relative to other countries, high levels of expenditure responsibility for education provision, this contrasts to health care in which they are one of the least decentralised countries. This is the exact reverse of Denmark.

Continuing our cross-country comparisons, Figure 1.1 examines the degree of expenditure decentralisation according to economic type.

Figure 1.1: The Composition of Sub-Central Government Expenditure[8]

(as a percentage of General Government totals in each category)



Source: IMF Government Financial Statistics (2002 edition)

Once more it is possible to observe the important role that sub-central governments play in national fiscal expenditure. For example, on average, 61% of the national public sector wage-bill is assigned to sub-central tiers. A similar important role can be observed in non-wage and capital expenditures. In line with the theory discussed above, which postulates that the centre should be dominant in areas of redistribution and stabilisation, sub-central involvement in the provision of social transfers is generally limited.

[8] Note that GFS does not split sub-central current spending into wage and non-wage components for Australia.

Again, substantial cross-country heterogeneity is evident among our sample countries. In most areas, Canada tends to have the highest level of expenditure decentralisation along with the other 'large' federations such as the USA and Germany. Interestingly however, the relative position taken by countries vis-à-vis others can differ considerably. For example, while Sweden has the highest percentage of national public wages assigned to the sub-centre and around average non-wage and social transfer expenditures, it has one of the lowest ratios of sub-central to central capital investment among our sample countries.

1.3.2b) Changes over time

Table 1.3 shows that across most countries, expenditure decentralisation has been stable over time. Discussions regarding alterations to the degree of decentralisation (typically movements toward increased decentralisation) have typically only taken place within the last few years. One country where substantial reforms have taken place is the UK. However, the devolution reforms for Scotland, Wales and Northern Ireland that took place in 1999, lie outside our sample[9].

The one exception to this observation is Spain where as noted earlier, decentralisation became an important component of the transition to democracy embodied in the 1978 constitution and has been progressive. Regional governments' share in general government expenditure rose from 11 per cent in 1980 to 32 per cent (close to the OECD average) in 1997, see Table 1.3 (and Figure 1.4). The progressive

[9] The most recent data in GFS (2002) relates to 1998.

transfer of primary and secondary education to Autonomous Communities (ACs) was completed in 2001 and a similar process is set to see the transition of health spending and non-university education to all ACs by 2004. However, many competencies again remain shared between the four tiers of government (central, the ACs, provinces and municipalities). There is additional complexity in that asymmetries remain between the functions assimilated by the "fast track decentralisation" ACs (the Basque country, Navarra, Andalucia, the Canaries and Valencia) and those available to the 10 "slow track" ACs which have been given the option to assimilate fewer devolved powers over a more protracted period[10]. However, it is fair to say that progress is being made on a framework to extend and standardise powers.

The issue of asymmetry is an important one that has attracted considerable attention in recent years. A number of countries have adopted an asymmetric approach to decentralisation, granting greater fiscal powers to some regions. The experience of the AC's in Spain as discussed above is a case in point as is the UK approach. In general, the UK has imposed considerable consistency to the shape of its local government by explicitly allocating functions to different tiers and generally avoiding clashes of competencies. More recently, the creation of devolved administrations for Scotland, Wales and Northern Ireland in 1999 has changed the nature of sub-central government and has had a major impact on the degree to which expenditure is assigned to sub-national jurisdictions. The remit of the UK's devolved administrations is clearly defined, though for historical reasons, the devolved territories have been granted different political and economic powers. For example, Scotland has much more exclusive control of functions such as education and health

[10] See Joumard and Varoudakis (2000).

even when compared to many more devolved unitary states and the Scottish Parliament has (limited) revenue raising powers, unlike the Welsh Assembly. Whilst the blueprint for English regional government is not yet entirely clear, it is already apparent that the ultimate pattern of devolution in the UK will not be symmetric.

Whether asymmetry is positive is open to debate. Russell-Barter (2000) exalts asymmetry as a virtue, in so far as regions are not forced to take on responsibilities they are not yet ready or willing to bear. However, political scientists, such as Le Galès and John (1997), argue that incrementalism carries considerable costs in terms of lost momentum for reform and the fuelling of inter-regional tensions.

1.4. Fiscal Autonomy

Having looked at how expenditure responsibilities are allocated, it is natural to consider how these should be financed. At the simplest level one can postulate that sub-central expenditures can be financed from two sources, either from revenues raised by the regional/state/local authorities or alternatively, they can be financed by the central government[11]. In line with the general policy discussion in the UK, we term the ability of sub-central authorities to raise revenue as fiscal autonomy. To be consistent with Loughlin and Martin (2003), we classify 'own-source' revenues as funding that sub-central units not only raise themselves, but we also require that they have some discretion in terms of how they are raised and for what purpose.

[11] The determination of the vertical tax structure is typically referred to as the 'tax-assignment' problem.

Central government finance of sub-central expenditures typically originates in two forms[12]. Firstly, there are central to sub-central government grants. Grants are a direct transfer of money from the centre to the sub-centre. They can come in a variety of forms such as block grants (the transfer of a 'lump-sum'), matching grants (the transfer of funds to complement money already raised at the sub-centre) and specific grants (the conditional transfer of funds to finance expenditures targeted by the centre). Block grants are typically aimed at addressing vertical (i.e. between tiers of government) and horizontal (i.e. between individual sub-central governments) imbalances. Matching and specific grants tend to be used by central governments to target specific policy areas which while not under their direct control, are deemed to be of social, economic or political importance to them. Under a system of block grants, the sub-central tier typically has relatively high discretion to allocate the money transferred as it sees fit. In contrast, with matching and especially specific grants, the local authority has far less autonomy and in many cases simply acts as the Agent in a Principal/Agent relationship with the body allocating the funding.

Secondly, there are tax-sharing arrangements[13]. Tax-sharing arrangements exist when two or more tiers of government receive revenue from the total tax yield from a particular tax. An example of a shared tax could be a national income tax whereby the centre receives 75% of all income tax receipts and the sub-centre 25%. The 25% share to sub-central governments could then be allocated to each sub-central unit either on the basis of a 'needs' based formula (e.g. population, unemployment etc) or through a bargaining process between individual units. Tax-sharing

[12] For a comparison of the two different types of transfer see Chapter 5.
[13] In the literature, shared taxes are sometimes referred to as non-exclusive taxes while own-source taxes are called exclusive taxes.

arrangements can differ for a whole variety of reasons. Two of the most important are i) the tax actually being 'shared' and ii) the extent to which each tier has autonomy to control the revenues received from the 'shared' tax. Some shared taxes give sub-central governments a degree of discretion over their base and rate. In other cases, the share received by each sub-central unit is determined by a formula detailed in the constitution or by a higher authority. For example, in Germany and Austria the revenue allocations which the Federal and Länder governments receive from the shared taxes are fixed and cannot be altered without the consent of both tiers. In contrast, in other countries such as Norway, the centre retains the right to unilaterally alter the revenue distribution. In some countries, the tax-sharing arrangement is such that the sub-centre is permitted within some boundary to alter the tax rate but not the tax base. Such arrangements are termed 'overlapping' or 'piggy-back' taxes. Again in Norway, local taxation rates must be below an upper limit fixed by the central government[14]. Therefore, the particular form of tax sharing arrangement is a key determinant of the level of central government influence/control over sub-central authorities and is an issue which we will return to in Chapter 5.

[14] Typically, all local governments in Norway have set their tax rates at the maximum level possible.

1.4.1 Theory

The theory of fiscal federalism provides a number of arguments for sub-central fiscal autonomy (see, for example, Gramlich, 1984) as opposed to central government finance[15].

First, it is argued that heavy reliance on grants and other centrally distributed revenues places too little pressure on local administrators and politicians to manage spending efficiently. Devolving fiscal authority is seen as important to ensure that financing and expenditure responsibilities are linked at the margin, so that local politicians can bear the costs of their decisions.

Various commentators have suggested that the crisis in democratic participation in local government elections in several countries, including France and the UK, is in part attributable to the lack of fiscal powers available to sub-central governments. For example, The Economist (2002) argues that the problem of democratic participation in local and devolved government will not be solved if the proposed English regional assemblies are granted few economic powers. It has been suggested that voter interest will dwindle in devolved government in Scotland and Wales in the absence of further devolution of fiscal powers.

Second, it is important that the costs of services are perceptible to the electorate in order to make meaningful decisions on alternatives. Expenditure increases on a particular area necessarily imply either higher taxation (or other

[15] The belief that sub-central governments should have the ability to raise revenues is an explicit component of the European Charter of Local Self-Government: Article 9.

sources of revenue such as user charges etc), cutbacks in other areas of expenditure, or increased fiscal deficits. In a system whereby sub-central units are largely responsible for expenditure but not revenue decisions, it is difficult for the electorate to 'see the bigger picture' and be aware of the true costs and benefits of increased targeted expenditure.

Thirdly, and perhaps most importantly, failure to grant revenue autonomy in line with decentralisation of expenditure can create negative incentives. Responsibility for expenditure without revenue responsibility can lead to a standard 'Principal-Agent Problem' between the centre (the principal and the funding source) and the sub-centre (the agents undertaking the expenditure). A commonly cited concern in such a situation is the creation of a 'Common Pool problem'. Each individual sub-central government unit has the incentive to spend as much as possible, fully internalising the benefits of the expenditures spent in their particular area but only internalising a fraction of the cost, which is instead shared across the entire population. A related concern is the possible generation of 'soft-budget' constraints, whereby sub-central governments overspend, safe in the knowledge that rather than see them 'bankrupt' and unable to provide even the most basic service, the 'lender of last resort', i.e. the centre, will 'bail them out' and fund their excess spending. For a discussion see Wildasin (1999)[16].

However, the literature on fiscal federalism also provides clear guidance on the limits that should be imposed on fiscal autonomy. Four arguments are highlighted here. First, the usual argument against complete fiscal autonomy is one of equity.

[16] This issue has been a major source of concern in Italy – see Bordignon (2000).

Jurisdictions with different levels of income and wealth will have very different tax resources at their disposal, and the need to ensure that citizens have access to a roughly equal level of public services will imply some degree of redistribution between sub-central governments. For this reason no industrialised countries, not even federal states, have opted for complete fiscal autonomy. A number of approaches to redistribution are feasible, through the use of vertical transfers funded from general taxation, 'pooling' arrangements between sub-central governments, or tax-sharing arrangements designed to benefit poorer jurisdictions. It is certainly important that sub-central governments have access to sufficient funds to adequately meet their spending responsibilities. Clearly there is a trade-off between equity and accountability: if resources are shared equally between sub-central governments, the incentive effects from fiscal autonomy disappear[17]. This has become one of the key issues that countries have to face in deciding the appropriate level of fiscal autonomy for sub-central tiers of government.

A second argument is that one has to avoid tax externalities, in the interests of economic efficiency. 'Tax exportation', McLure (1967), is one such problem. If taxation decisions by sub-central governments impinge on non-residents, then local residents and politicians will fail to fully internalise the 'true costs' of public services and there is likely to be a degree of over-provision. Of course, insofar as non-residents benefit from service provision, then there could be under-provision, a problem that often arises with large metropolitan areas and satellite towns. A way to deal with this problem is to ensure that different types of taxes are assigned to different levels of government thus avoiding tax exportation between sub-national jurisdictions.

[17] Of course, it is possible that fiscal equalisation may be undesirable if it holds back the development of poorer areas by impeding the necessary inter-regional flow of resources.

A third limit on fiscal autonomy is a consequence of the potential migration of factors of production. Tax competition is a fact of life in most systems, and the mobility of capital and labour imposes natural limits on fiscal autonomy. This is why most decentralised taxation systems still assign the majority of ability-to-pay or redistributive taxes to central government, especially corporate taxes, which fall on the most mobile factor, capital[18]. Most countries that have opted for a substantial degree of fiscal autonomy have tended to rely on i) benefit taxes or user charges (based on the benefit consumers derive from local services), ii) taxes on immobile factors such as property, or iii) small changes in ability-to-pay taxes (such as local income tax), where limits may be applied to prevent tax-induced migration flows across regions – see Section 1.4.2. The 'race to the bottom' is often cited as an argument against sub-central taxation autonomy, with the fear that individual sub-central units will become involved in a downward spiral, consistently trying to 'undercut' the tax rates of their neighbours[19]. While inter-regional competition is desirable within limits (i.e. encouraging politicians to adopt efficient levels of public goods and not set excess tax rates) too much competition can be harmful. However, whether this happens in practice is debatable. Hines (2004) argues that harmful tax competition is unrealistic once one takes into account the other side of the coin – i.e. expenditure decentralisation. He argues that some regions will be tempted to set low tax rates but others will be satisfied to have higher tax rates coupled with greater and more efficient public service provision, financed by higher taxes. However, one concern is that armed with a number of tax instruments, for example one on a mobile

[18] As Tanzi (2001) points out, there is a danger that high levels of decentralisation can segment the single national economic market.
[19] See for example Enrich (1996).

tax base (such as capital) and the other on an immobile base (such as property), inter-state tax competition can lead to the burden of finance being unfairly placed on the immobile factor. Empirical evidence on inter-regional tax competition is relatively limited. There is some evidence to suggest that such behaviour exists, see for example Case *et al.* (1993), but whether this leads to negative outcomes is unclear.

Finally, a fourth argument against fiscal autonomy is that it can generate administrative complexity. In essence, it is argued that managing a national tax system is feasible at lower cost (i.e. economies of scale) and this implies that financing systems based on grants or tax-sharing arrangements are optimal. In fact, in the case of any modern developed economy, this is likely to be a spurious argument. There is no reason why one needs to decentralise the tax collection system, as evidenced by a number of OECD countries which manage the collection of taxes shared by different jurisdictions through a single national tax collection system. However, if national tax collection systems have to cope with a plethora of shared taxes between jurisdictions, clearly this can increase administrative costs.

A more subtle version of this argument relates to the visibility, transparency and complexity in decentralised tax systems. A complex tax system, where various jurisdictions share the same tax base, and where sub-central governments have important fiscal powers, may lead to less transparency in the fiscal system. Much attention is therefore required in the construction and presentation of the chosen system. It is important that voters understand the operations of the different levels of government if accountability is to be achieved (Tanzi, 2001).

To summarise, economic theory suggests that some degree of fiscal autonomy can render policy-makers more accountable, and may improve economic efficiency. Against this, there are concerns regarding tax competition, externalities, equity and transparency. It is unlikely, that one particular formula for revenue decentralisation will be appropriate for all countries. The 'optimal' level will depend largely on individual country economic and political characteristics[20]. In the following section we discuss how the countries in our study have tackled the issue of fiscal autonomy.

1.4.2 Comparative Evidence: Fiscal Autonomy

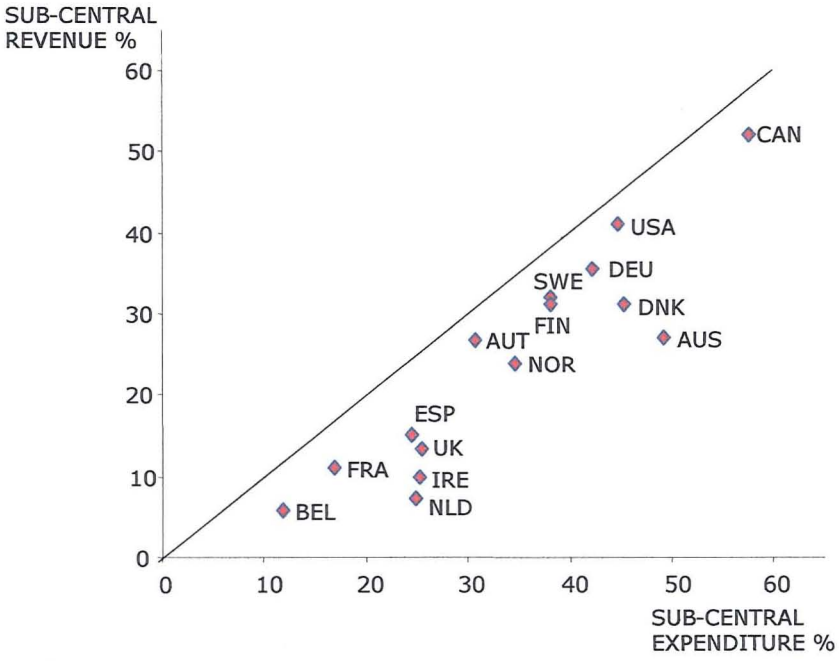
1.4.2a) Levels of Revenue Decentralisation

Figure 1.2 provides internationally comparable information from IMF Government Financial Statistics (GFS) on the degree of revenue decentralisation, and for comparison expenditure decentralisation, across our sample countries. In addition, Figure 1.3 highlights the sources of sub-central revenues accordingly - grants, taxes and 'other' sources, predominantly user charges and fees.

[20] One of which will, of course, be the level of expenditure decentralisation.

Figure 1.2: Fiscal Decentralisation

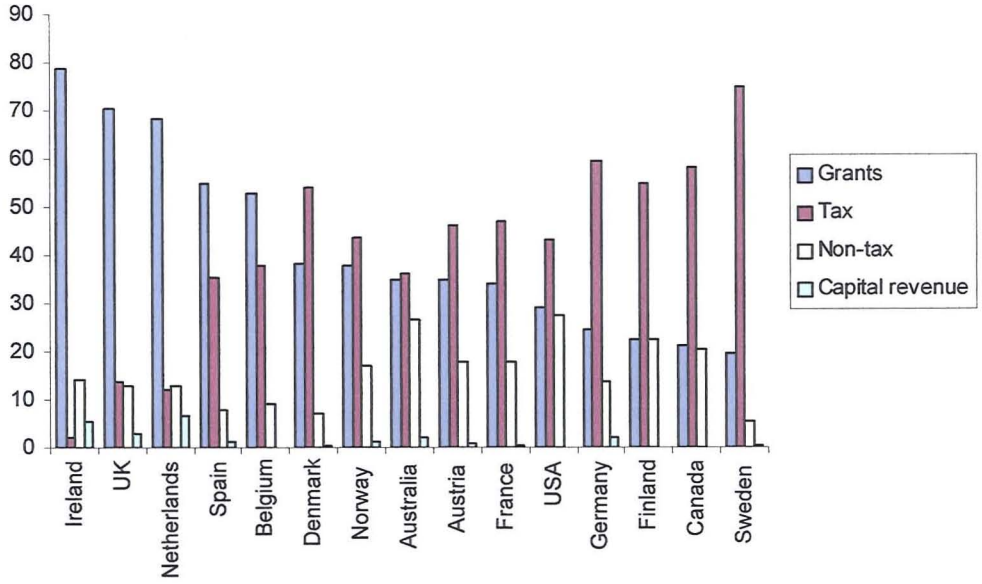
(Sub-Central Expenditure and Revenue as percentages of General Government totals)



Source: IMF Government Finance Statistics (2002 edition). Note: figures shown are sample averages.

Figure 1.3: Composition of Sub-Central Government Revenues

(as a percentage of their Total Revenues)



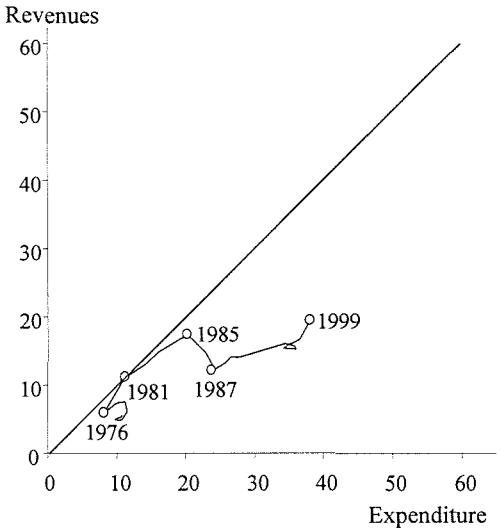
Source: IMF Government Finance Statistics, 2002.

Note – figures relate to 2000 for Canada and Denmark; 1999 for Australia, Austria, Sweden and USA; 1998 for Belgium, Finland, Germany, Norway and the UK; and 1997 for France and the Netherlands.

From Figure 1.2 we can clearly observe that substantial amounts of national government revenue are assigned to most countries in our sample. Note however, that the degree of revenue decentralisation is considerably less across all countries, than the degree of expenditure decentralisation. This is reflected in the fact that all our country data points lie below the 45^0 line. The vertical distance between each point and the 45^o line shows how dependent the country's sub-central tier of government is on grants from the central tier. On average across the 15 countries, over a third of total fiscal expenditure (35.1%) and a quarter of revenues (25.6%) are assigned to (i.e. under the control of) sub-central governments.

The Spanish experience is again of special interest as it is the one country in our sample where there has been the greatest reform in the level of fiscal decentralisation. Devolution of revenue raising powers lagged the rapid decentralisation of spending competencies. The process has been characterised by growing imbalances between tax assignments and expenditure functions. Figure 1.4 demonstrates this. Figure 1.4 is identical to Figure 1.2 however, it shows the time path of the level of sub-central expenditures and revenues in Spain from the later 1970s to the present day. As before, the vertical distance between each point and the 45^0 line shows the extent to which sub-central jurisdictions in Spain were dependent on central government grants. In the early years of the new Spanish Constitution, sub-central governments raised and spent relatively small amounts. As the level of expenditure decentralisation has increased through the 1980s so have sub-central revenues. However, the increase in expenditure decentralisation has far outweighed the level of revenue decentralisation resulting by 1999, in a substantial vertical imbalance.

Figure 1.4: Fiscal Imbalances: Tax and Non-Tax Revenues and Expenditure of Sub-Central Governments in Spain



Source: IMF Government Financial Statistics, 2002

Notes:
1. Revenues include taxes, fees and other sources of non-tax revenues but exclude grants.
2. The figures are expressed as percentages of general government totals.

Figure 1.3 shows that there is a great deal of heterogeneity regarding the sources of sub-central finance in our sample countries. Certain countries, such as the UK, Ireland and the Netherlands rely heavily upon central grants to finance their expenditures. In others, such as the USA and Canada, taxation appears to represent a far greater source of revenue for sub-central authorities. In what follows, we take each element of sub-central finance in turn, and discuss the issues pertinent to this particular revenue source and the importance of this form of finance in particular countries. Firstly however, we examine the issue of vertical imbalances more closely.

1.4.2b) Vertical Fiscal Imbalances – Country Experiences

We have noted a number of cases where decentralisation of spending greatly exceeds the level of fiscal autonomy. As discussed above, there are good reasons for this. However, decentralisation of expenditure without similar revenue decentralisation can create a number of problems, not least in the incentive constraints faced by sub-central politicians. In this section, given its importance, we examine this issue explicitly and discuss a number of instances where this has been of direct concern to individual countries.

The experience of Italy though not included in our sample due to data limitations, offers a clear example of the kind of problems that this mismatch can give rise to, and illustrates how these problems can be exacerbated when central government also imposes standards on local provision. Specifically during the 1970s, reforms had been aimed at simplification of the tax system and regaining central government control at a time of macroeconomic crisis. These reforms actually reduced the extent of sub-central fiscal autonomy, but at the same time spending responsibilities were progressively devolved. Particular areas of tension emerged in the provision of health and transport services where the regions were given key responsibilities for service delivery. The system of grant finance was based on historical spending shares with insufficient reference to performance or needs and failed to promote efficiency together with weak incentives to contain spending. Conditional grants often took on the character of entitlements, through central government imposition of "essential" standards. As Bordignon (2000) and Bosi and Tabellini (1995) note, this led to a clear problem of 'moral hazard', with regions

blissfully running spending overruns in key areas, knowing that the central government would bail them out[21]. This situation, in which the system of vertical transfers rewarded profligate and inefficient regional governments, obviously worked against regional fiscal responsibility. The Italian case is an extreme example due to the particular administrative framework that allowed budget overruns and a political environment that encouraged 'bail-outs'. However, in relation to specific areas of expenditure similar problems can be identified elsewhere.

In Denmark, high growth in expenditure on childcare and care of the elderly since the 1990s, reflects central government policy. Fiscal balance has not been a major concern of the local providers since additional spending has typically been funded by higher revenues and higher provision in subsequent years. Local governments have repeatedly blamed overruns on agreed spending on the centrally imposed objectives and regulations, and have resorted to unplanned tax hikes, while parliamentarians have criticised local authorities for not meeting centrally initiated objectives and not complying with negotiated budgetary limits, Dauguaard (2002). However, it is clear that the central government has effectively separated the discretion to decide policy from the responsibility of finance spending. The existence of targets that lack credibility and are regularly not met raises moral hazard problems. Reforms proposed by the OECD and others include imposing financial penalties on tax increases, and extending local discretion to other forms of taxation, tax allowances and user fees, Bibee and Goglio (2002).

[21] In fact, the constitutional court has sided with the regions and ordered central government to provide additional grants to cover the costs of providing nationally mandated "essential" services.

These examples serve to illustrate that if central government is intent on maintaining the level of key public services, sub-central governments can exert real pressures for increased vertical transfers, unless these are explicitly prohibited by law. Clearly, if budget constraints are to be binding, lower level governments should suffer the consequences of their own mismanagement and should not be able to rely on transfers from above to 'bail them out' of financial difficulties. If this is not the case then sub-central governments may have the incentive to overspend. This institutional behaviour is one of the most serious potential negative consequences of fiscal decentralisation.

1.4.2c) Grants

As noted above, the potential benefits of decentralisation may cease to exist if local governments suffer from a poor capacity to implement spending. Redistribution via transfers of nationally collected tax across local jurisdictions is generally used to ensure that an adequate level of provision can be achieved no matter how strong or weak the taxing capacity of the sub-central jurisdiction.

In addition, if regions are subject to different cyclical developments the pooling of risks can raise welfare. Pooling may be achieved more easily through vertical transfers from the centre to the regions rather than through horizontal transfers between independent localities, see Oates (1972) and Musgrave and Musgrave (1976). In general, transfers can take two forms i) a grant from a higher tier

of government or ii) an allocation of a share in nationally collected or pooled taxes. We discuss grants in this section and taxation in 1.4.2d).

It is immediately clear from Figure 1.3 that certain European countries such as the UK, Ireland and the Netherlands have traditionally financed most of the spending of its sub-national jurisdictions through grants. This heavy reliance on grant funding presents a striking contrast with most other federal or Scandinavian countries[22].

Most countries operate some kind of agreed and transparent formulae-based allocation of transfers, in part to eliminate costs of frequent negotiations. Equalisation schemes have the advantage of discouraging competition between authorities to attract higher-than-average earners with low needs, though at the same time overly generous equalisation formulae can weaken the incentives to attract residents by improving the quality of services or being more efficient. Furthermore, if tax collection is the responsibility of regions prior to central pooling and redistribution, then it is also possible that richer regions will put in less effort to the task. These concerns have led some countries to cap the extent of revenue equalisation. Certain countries have attempted to introduce positive incentive schemes to counteract such incentive concerns. For example in Spain, the AC's are permitted to retain a proportion of any positive deviation from the budgeted increase in receipts (tied to the growth of a basket of taxes including personal and corporate income taxes and VAT), Joumard and Varoudakis (2000).

[22] Note that in line with the earlier discussion, the relatively high dependence on grants in Denmark in part reflects 100% transfer refunding.

Throughout our sample countries, a great variety of alternative formulas and structures have been put in place for allocating grant revenues among regions. In many instances, while attempting to be transparent, the allocation of grant finance can sometimes be anything but. This in turn can lead to controversy and tension between different regions, especially if a sub-central unit feels as though it has been 'hard done by' in recent negotiations/budget calculations etc. Even within individual countries grant allocation mechanisms can vary greatly both across time and type of grant being allocated.

For example, in Spain a variety of grant formulae have been put in place, the most important of which is redistributed pooled tax revenues based on expenditure need as measured by population size, personal income and tax capacity. Additional criteria at the provincial and municipal levels include surface area and school age population. The slow delegation of revenue raising powers in Spain has in part reflected the need to collect relevant information on costs of provision as well as differing needs and preferences, most of which was unavailable before. Spain's sub-central fiscal autonomy and the formulae employed are therefore, continuing to evolve.

In France, where autonomy is more limited (see Figures 1.2 and 1.3), the main grant, the *Dotation Globale de Fonctionnement* uses objective factors based on need (population, school population, tourist numbers, and fiscal capacity). Separate allocations are made for capital grants, *Dotation Globale d'Equipement*, which tend to support local initiatives by matching investments by Communes and Départments.

Post-war Germany has operated a system of horizontal equalisation aimed at equalising revenues between poorer and richer Länder. This system, the *Finanzausgleich*, has been very successful in maintaining a high degree of uniformity in public services throughout Germany. In 1997, following the incorporation of the East German Länder into the system, 6.1 bn was transferred from the richer to the poorer Länder, compared to only 1.5 bn in 1994. In addition to these horizontal transfers, a number of federal grants were made to fiscally weaker Länder (7.2 bn in 1997), see OECD (1998). Overall, 20% of Länder revenues came from grants, including transfer payments from the equalisation system. In 2001, a new agreement was reached for the period 2005-19 which maintains a federal contribution of about 10 bn per year, OECD (2002). Some observers have argued that this extent of equalisation has led to a lack of accountability, see Spahn and Franz, (2000). Whilst the reforms have attempted to address a perceived need to incentivise the Länders' performance and efficiency, equity remains a guiding principle of the new system.

In contrast, as highlighted by Oates (1999), grants designed to counteract horizontal imbalances between US States are relatively limited. Instead, intergovernmental grants in the US typically address specific functions or programs, but usually do not explicitly target the issue of inter-state equity. However, at the State level, equalising grants to local jurisdictions are more frequently observed, notably to school districts.

In many cases equalisation schemes are self-financing. In Sweden one such scheme has covered all the municipalities and counties since 1996; it aims to offset 95% of the differences in taxable income per capita between local governments and

allows for major differences in service delivery costs. In Denmark a grant is payable to local authorities with a tax base per capita below 90% of the national average. Again, the size of the grant paid is based on expenditure need and is evaluated using a range of demographic and social indicators, see OECD (1997).

In some countries, grant distribution is inextricably linked to 'historical' shares in addition to, or instead of, a formal equalisation scheme. A common set of difficulties can arise when allocations are closely linked to historical shares as they are likely to place too little emphasis on efficiency and the containment of spending. For this reason, with very few exceptions, European countries have moved away from allocation formulae based on historic shares, such as the UK's Barnett formula, towards formulae that use objective parameters measuring fiscal need and tax-raising capacity – see above.

Whilst the UK has always had a system of grant allocation based on fiscal need for local government, it has resisted any reform of the Barnett formula for the allocation of block grants to its main devolved regions (see Twigger (1998) for an explanation of the formulae). In so doing, the UK remains, with Italy, one of the few countries that has resisted the trend towards needs-based formulae and has remained with historical and political expediency. However, there is growing recognition that any further move towards financial autonomy for the UK's main devolved units, will bring with it a need to address the issue of horizontal equalisation and will require some reform of the grant system, see for example, Muscatelli (2001) and Cuthbert (2001). Further progress on the devolution agenda, such as the creation of regional assemblies in England, will also bring the issue of needs assessments to the fore.

There is some evidence to suggest that electoral concerns, in addition to equity considerations, can strongly influence central governments' funding of sub-central tiers. In a study of English local governments, Ward and John (1999), found that local councils controlled by the party in power at the central level and marginal constituencies were more likely to receive relatively generous grant allocations than those controlled by other parties.

We have already discussed the use of central government directives to influence spending decisions, but constraints attached to funding may also be used to exercise control on local provision. This is demonstrated by the use of a whole host of alternative types of 'specific' grants. Specific grants can come in a variety of guises, such as earmarked, conditional or matching grants. The use of such grants is typically justified if there is evidence of strong inter-regional spill-over effects from the provision of particular services. It is arguable however, that if such issues are pervasive, provision and funding of such services might be more appropriately retained by central government. This was certainly a key factor motivating the recent shift of the responsibility for hospitals back to central government in Norway[23].

The form of the restrictions imposed obviously affects the nature of the budget constraints facing the sub-central tiers of government. This can give rise to the so called 'flypaper effect' - that is that grants "stick where they hit", resulting in a different allocation than would arise from the same marginal change in own tax revenues, see for example, Courant *et al.* (1981).

[23] This transfer was accompanied by a reduction in the block grant and the upper limit on local tax rates, matching the reduced county expenditure level. The transfer of capital equipment was compensated via ear-marked grants.

Given the distortions involved, the heavy use of specific grants has been criticised on efficiency grounds.

The following table is taken from the Council of Europe (2000) and shows the percentage of total grants classed as either block or specific grants. This is the first study of its kind and relates only to European countries.

Table 1.4: General and Specific Grants as a Percentage of Total Grants

Country	Block Grants	Specific Grants
Austria	100	0
Belgium	83	17
Denmark	100	0
Finland	97	3
France	100	0
Ireland	19	81
Netherlands	93	7
Norway	55	45
Spain	24	76
Sweden	58	42
UK	54	46
Australia[1]	56	44
USA[1]	15	85

Note:

1. Information on Australia and the USA from 'Local Government Grant Distribution: An International Comparative Study'. No information is available for Canada.

Again we observe a great deal of heterogeneity with regard to the use of block and specific grants across European countries. Some countries such as Ireland and Spain appear to make substantial usage of specific grants, whereas in others, Belgium

and Austria for example, block grants are the sole source of central to sub-central grant finance.

In recent years there has been a general trend away from earmarked or specific grants toward more general block grants. For example, in 1986 the Norwegian central government introduced the 'General Purpose Grant Scheme' which replaced a system of about 50 earmarked grants – see Joumard and Suyker (2002)[24]. In Sweden, some 90% of grants were earmarked until 1992, with extensive regulations on provision imposed. However here too, reforms aimed at improving the efficient use of local resources and encouraging innovation have now reduced that figure to around 25%, see Roseveare (2002).

It is thought that the use of earmarked grants can erode local accountability and the remaining benefits from sub-central provision are then less clear. Only block or untied grants appear to be fully consistent with autonomy of local decisions. A further problem with specific grants is that costs of provision are less likely to be perceptible to citizens. If sub-central governments have access to their own taxes, this particular problem may be solved.

[24] This figure will reflect shifts in finances following the transfer of hospital finances but may be distorted by the presence of ad hoc ear marked grants compensating for the transfer of capital equipment. Unfortunately intertemporal and cross country comparisons are not feasible since, to the best of our knowledge, there is no comprehensive source of internationally comparable data on proportion of intergovernmental transfers that are earmarked or conditional as opposed to general purpose.

1.4.2d) Taxes

As discussed in Section 1.2, GFS provides a single figure for sub-central tax revenues and does not distinguish between revenues collected through shared taxes, piggybacked taxes, or taxes that are completely locally determined. As noted above, shared taxes can be an attractive source of revenues, given the potential benefits of pooling risk and the relatively low administrative costs involved.

In discussing fiscal autonomy it is relevant to consider the extent to which sub-central governments control their own tax base or tax rates. Using the classifications provided in OECD (1999) and information supplied by Jonathan Rodden combined with the GFS data we are able to generate a weighted 'Index of Fiscal Control' that addresses this point[25].

Specifically, the OECD use a classification of sub-central tax revenues ranging from (a) where the sub-central government can set both the tax rate and tax base, to (e), where central government sets both the base and the rate of taxation. Tax sharing schemes (d) are divided into four categories from (d.1) where the sub-central government can determine the revenue split, to the other extreme (d.4) where the national government can unilaterally decide the revenue split.

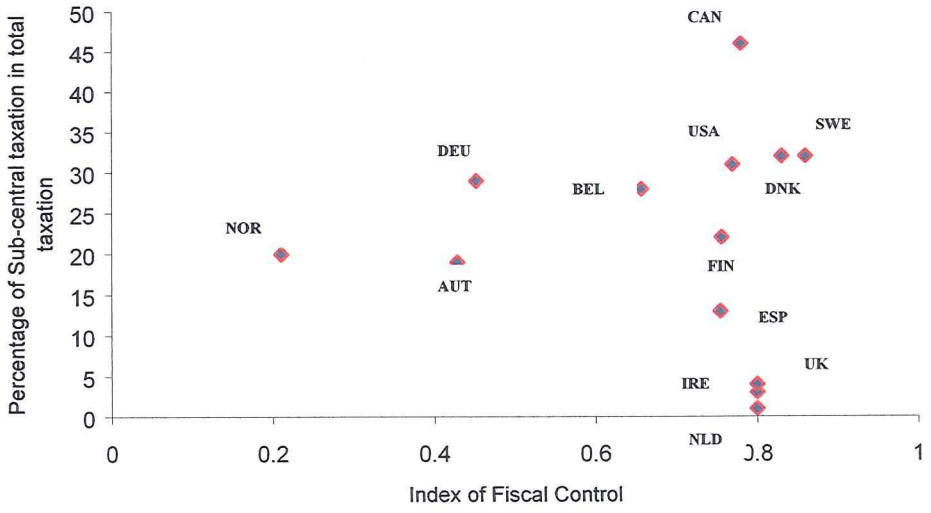
There are, however, two caveats with this information. The first is that it results in the loss of observations for two countries (France and Australia). The

[25] We use this information throughout this thesis.

second is that the reference date for these measures of tax autonomy is fixed at 1995 levels.

In Figure 1.5 we summarise this evidence. The vertical axis shows the tax revenues received by sub-central governments as a percentage of total tax revenues, so providing a measure of the importance of sub-central financing of public services. The horizontal axis plots a constructed 'Index of Fiscal Control', reflecting the extent to which tax revenues can be considered to be controlled at sub-central level. It follows that the countries closest to the north-east corner of the graph are those in which the sub-central governments have the greatest degree of fiscal autonomy: that is they have a large share of total taxation and have greater control of taxation receipts. Details on the construction of the 'Index of Fiscal Control' are given in an appendix.

Figure 1.5: The Importance of Sub-Central Levels of Government and the Extent of Fiscal Control



Source: IMF Government Financial Statistics 2002, OECD (1999) and own calculations[26]

[26] Note the data for the USA and Canada is provided by Jonathan Rodden of MIT. However, the number is limited to the percentage of sub-central revenues in the USA and Canada where the sub-centre has control over the tax rate and the tax base. Thus, the 'Index of Fiscal Control' for these two countries is likely to be an underestimate.

Some comment on individual countries' location in Figure 1.5 is necessary. It is apparent that, although the UK's local government layer has a reasonable degree of autonomy, the sub-central levels of government in the UK control a very small proportion of total taxation[27]. The 'gearing effect' which necessarily follows, has been at the centre of policy discussions regarding possible reform to the council tax system. In contrast, whilst sub-national jurisdictions, for example in Scandinavia and Belgium, have slightly lower degrees of fiscal control, the total importance of sub-central government is much greater. Contrasts between federal states are also apparent: Canada and the USA grant their sub-central governments the greatest control over taxation in our sample, whilst the German and Austrian Länder have far less independent control.

There is broad consensus in the literature that the central government should be assigned taxes that have certain tax base characteristics – see Norregaard (1997):

1) Tax bases that are mobile.
2) Tax bases that are sensitive to income.
3) Tax bases that are distributed unevenly across regions.

Historically, the primary form of sub-central taxation has been the property tax. In a study undertaken by the Council of Europe (2000), property taxation was a source of direct income for sub-central governments in 23 out of 25 countries

[27] Note that since the UK figures relate to 1998 they pre-date the introduction of the Scottish tax varying powers (the 'tartan tax'). However since the Scottish right to vary the rate of income tax has not yet been exercised, and in any case would have a very small impact on total Scottish tax revenues, it is fair to say that devolution has thus far had little change on the position of fiscal autonomy.

analysed. It is often seen as a 'good' local tax, as administration costs are typically low, it is clear which unit of government is entitled to the revenue it yields and it is a relatively reliable source of income. The actual tax base adopted does however, vary considerably across countries. It can be a tax on land, buildings or some combination of the two. There is also a wide variation in the property tax as a proportion of local tax revenue ranging from 100% in the UK, Ireland, USA, Canada and Australia to very small proportions in others such as Belgium, the Netherlands and Spain.

While property taxes have the advantage of immobility of the tax base, to the extent that some beneficiaries of services are not homeowners, the costs of provision are less perceptible; also the tax base for property taxes generally grows relatively little over time. Further, property taxes universally realise lower returns than required. There are many reasons for this, including the fact that it is a very visible tax and thus politically unpopular.

Business taxation and to a lesser extent income taxation, are the two principle additional taxes commonly available to sub-central tiers. A local income tax is found in all Scandinavian countries and is becoming increasingly viewed by many in the UK as a potentially more advantageous form of local taxation than the council tax[28]. For a breakdown of the sources of taxation revenues in the Scandinavian countries see Table 1.5.

[28] See for example 'The Centre for Council Tax Reform', www.counciltaxreform.org, and 'Is it Fair?", www.isitfair.co.uk.

Table 1.5: Sub-Central Revenue Sources for Scandinavian Countries				
	Finland	Sweden	Denmark	Norway
Tax Income				
Income Tax	42	60	52	40
Business & Property Tax	12	N.A.	8	1
State Transfers				
Block Grants	17	16	10	23
Earmarked	2	5	8	17
User Fees and Charges	25	18	21	14
Other Income	3	1	1	5

Source: Table 3 Mønnesland (2002).

The right of local authorities in Scandinavia to set local income tax rates is seen as the cornerstone of their local government autonomy, but in reality the systems are fairly restrictive. In Norway, local governments can set a local income tax within a range set by the central government. However, in practice, all the regions apply the maximum rate[29]. The Danish central government has in principle abstained from direct intervention to set constraints on local taxes. However, the system of formalised budget co-operation between central government and local government associations, links the size of central transfers to local tax setting decisions and in reality appears to have a similarly restrictive effect on the autonomous setting of tax rates, Mønnesland (2002)[30]. In Sweden the central governments' commitment to fiscal consolidation in the 1990s gave rise to various *ad hoc* regulations that have at least temporarily limited

[29] Similarly, municipalities are able to levy a tax on net wealth, within a centrally determined band, but again all set the same maximum permitted rate.

[30] A downside of the Danish system appears to be the nature of the negotiation process between the centre and sub-central units which it is argued has hampered transparency and the formulation of multi-year planning, see Daugaard (2002).

local autonomy, these include the imposition of a cap on tax rates between 1991-93 and the central government taking a 50% share of any increase in tax revenue from 1997.

From 1994, the Spanish ACs have been allowed to obtain a share of the personal income tax raised in their own territory and in recent years they have gradually been granted greater autonomy over such revenues. In addition, the share of income tax as a percentage of total tax raised by ACs has continued to rise.

Among the discussed advantages of local income taxation is that they are capable of generating sufficient revenues to fund local services. In comparison to business taxation they have the advantage of being less likely to lead to harmful tax-competition between regions in an effort to attract new industry. However, there are a number of significant disadvantages which may explain the relative reluctance among countries to implement a local income tax. One clear disadvantage relates to horizontal equality. If regions have different income levels, then the potential revenue levels that can be raised in rich regions will be substantially higher than in the poorer regions. Further, receipts can fluctuate as the economy moves through the economic cycle to a far greater extent than revenues from property taxation.

Local business taxation is relatively more common than income tax however, it tends not to constitute a substantial share of regional or local revenues. The main form is a company tax and this is found in Belgium, France, Germany and Spain[31]. One explanation for the relatively low reliance upon business taxation is the

[31] Following the devolution reforms in the UK, the ability to set non-domestic rates in Scotland is now the responsibility of the Scottish Parliament.

unpredictability of such revenues. Corporate tax revenues are relatively more volatile, given their dependence on cyclical activity, rather than property, income, wealth or sales taxes. Reliance on corporate taxes could therefore, lead to substantial fluctuations in sub-central income.

Sales taxes can come in a variety of guises, such as single stage taxes, including excise and retail taxes or multi-stage taxes such as turnover taxes and VAT. The main disadvantage of local sales taxes are the distortions that can be generated as consumers are driven to making purchases away from high tax areas. Consequently, while we observe regional sales taxes in the US and Canada, they are less feasible within European countries where devolved regions are significantly smaller than US states, and in any case there are EU wide limits on sales taxes.

Natural resource taxation has been the least popular instrument of sub-central finance raising. The exception to this is in Canada, where such taxes represent a significant proportion of total provincial taxation – see 'Local Government Grant Distribution: An International Comparative Study'. The major limitation with reliance upon natural resource taxation is one of equity[32]. Clearly, valuable resources are not distributed evenly between regions and hence certain regions will have far more valuable tax bases upon which to draw upon. For example, during the decade until 1985, the richest province in Canada, Alberta, consistently had a per-capita revenue raising capacity that was double the capacity of the poorest provinces, Newfoundland and Prince Edward Island. The use of natural resource taxation in Canada is a special case and to address issues of equity the Canadian system involves a complex

[32] In addition, revenues from natural resource taxation can be volatile owing to price fluctuations.

horizontal equalisation scheme, which is mandated by the Constitution. In addition, there is the danger with natural resource taxation that resource-rich regions and central governments would both seek to compete for the taxation revenues, leading to excessive taxation on natural resource.

In summary, most countries that have granted a greater degree of fiscal autonomy to their regions have done so through a greater delegation of taxes on immobile factors and to a lesser extent, on personal income and business. Where taxes are devolved to lower tiers, the choice of tax and any limits set should pay heed to tax externalities. Many countries leave the responsibility for tax collection with central government, which can ensure equal effort is put into collection across the country. This is easier to administer even if there is a system of local tax surcharges.

1.4.2e) User Charges and Fees

It is also possible to compare the extent to which individual consumers or companies contribute directly to the provision of services by the public sector, via user charges and fees including collective and co-payment arrangements – see Figure 1.3. Within this category a distinction can be made between 'real charges' and 'quasi-charges'. With real charges, what individuals pay is closely related to their usage of the charged service (e.g. water charges based on meter readings etc). Quasi-charges are when the amount of money an individual pays is based on formulae rather than their actual usage of the services (e.g. charges for water based on property values etc).

User charges can be a useful source of revenues and can be helpful in relaxing supply constraints and strengthening the influence of demand. By charging at the point of delivery they are also highly perceptible and relieve pressure on general tax revenues. In addition, concern over the distortionary effects of tax financing, fairness and a wish to make costs more perceptible to consumers, are all factors that potentially support increases in the scope of user charges. However, the scope for user charges tends to be limited, because of i) relatively high collection costs in comparison to the sums that can be levied, ii) concern over access by low income groups[33], or iii) the kind of services best suited to charging have already been privatised. Further, by the very nature of public goods it is not surprising that this category makes up the smallest component of total sub-central government revenues.

The OECD has been critical of low reliance of user charges in various countries, e.g. in the areas of child-care, care of the elderly and pharmaceuticals. Trends in these areas suggest that take-up of free services is booming and supply-side rationing is considerable, Atkinson and van den Noord. (2001). The provision of services free of charge, or without making costs perceptible, obviously risks prompting excessive demand and hitting supply constraints, since the social costs of supply are largely irrelevant for the individual. User charges offer the potential to gain more information about price sensitivity of demand for services and can potentially influence demand pressure directly rather than being expressed indirectly and imperfectly through the electoral system. Demand pressures may also be influential on supply side efficiency. User charging will however, be viable only if the costs of collection and of compensation through the benefit system are low relative to the

[33] This concern can be reduced to a certain extent by the reimbursement of charges via the benefit system.

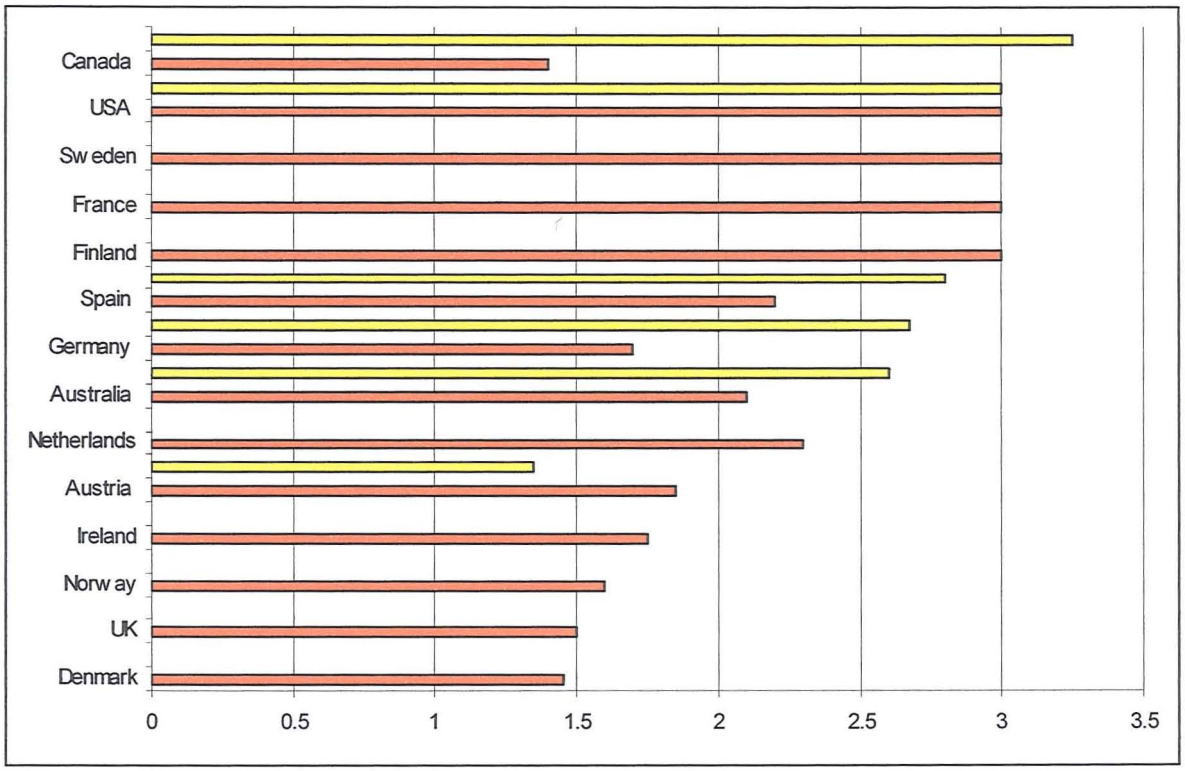
sums that can be levied and the efficiency gains that can result. Countries that have tried to increase reliance on fees and charges have generally aimed to strike a balance between co-payment and maximum contributions, to avoid imposing unduly high expenses on some households.

Among developed countries, the USA and Australia have the strongest culture of user charging, particularly for facility and utility services. In most other countries, the proportion of non-tax revenues to total sub-central revenues is typically small. The scope to extend user charges has been limited in recent years by the extent that the delivery of key services has been privatised. In addition, cross-country evidence shows that even in the area of user charges, central governments retain a degree of influence. For example in Norway, while sub-central governments are permitted to impose user fees, they are required by the centre to be set below costs.

1.4.2 f) Borrowing Autonomy

The ability of any level of government to borrow can be helpful in facilitating short-term smoothing and to finance investment projects. However as discussed above, threats to fiscal sustainability can derive from insufficiently hard budget constraints, and a lack of expenditure restraint. These considerations lead many central governments to place restrictions on the ability of sub-central authorities to borrow, see for example Pisauro (2001) and Rodden (2002) for more detailed discussions of these issues. Figure 1.6 shows an index of borrowing autonomy from Rodden (*op cit.*).

Figure 1.6: Index of Borrowing Autonomy



Source: Rodden (2002).

Note: The index is bounded between 1 and 5 where 1 = no borrowing autonomy and 5=high borrowing autonomy and the period assessed is 1986-1996 where feasible. The light bar relates to the state/regional government while the darker bars relate to local government.

It is interesting to note that there is sometimes little relationship between the degree of decentralisation in spending and borrowing autonomy. For instance, in France regional and local authorities have considerable latitude in deciding how much to borrow for capital expenditure, although borrowing is not allowed to cover current expenditure or to refinance existing loans.

In Germany, the Länder and local authorities can only borrow for investment purposes, in proportion to their financial capacity, and subject to agreement by the Länd's interior ministry. Spain also sets limits to total debt service spending and only allows short-term borrowing to cover cash-flow requirements and long-term

borrowing to finance public investment projects. However, Joumard and Varoudakis (2000) argue that in the absence of penalties, these rules are not enforced effectively. They suggest that non-authorisation of access to credit markets has had the result that sub-central authorities make greater use of bank loans which are less effectively regulated, but more expensive. Deficit restraint at sub-central level in recent years has been attributed to the annual programmes of deficit reduction that are bilaterally negotiated between the Federal government and each region, rather than controls on borrowing.

Elsewhere too, the Maastricht criteria, and subsequently the Stability and Growth Pact, have forced the imposition of greater controls over borrowing by sub-central governments. For instance, Austria introduced an 'Internal Stability Pact' in January 1999 to help ensure that the overall deficit position for all levels of government does not exceed 3%. This is done by allowing very little margin for borrowing by sub-central tiers of government, who are only permitted to run an aggregate deficit of 0.3% of GDP[34]. One possible justification of the low margin is that temporary deterioration that is best covered by temporary borrowing is likely to be caused by the operation of automatic stabilisers, which are largely the concern of central government. A limitation with such *ad hoc* solutions is that they might place too much of a constraint on public investment. This is a well-known criticism of the EU Stability and Growth Pact in contrast to the 'Golden Rule' for borrowing adopted in the UK.

[34] A similar 'internal pact' has been imposed in Italy.

1.5. Conclusion

In this chapter we have summarised the arguments for and against alternative levels and forms of fiscal decentralisation. In addition, we have shown how various countries have interpreted such arguments and constructed their central and sub-central fiscal arrangements accordingly. The crux of the decentralisation/federalism policy debate centres on the attempt to obtain the most appropriate mix between responsible and efficient policy setting at both central and sub-central tiers of government.

We have outlined the key arguments for and against alternative levels and forms of decentralisation. At an intuitive level, decentralisation is often advocated on the grounds of possible efficiency gains from smaller operations, accountability of policy decisions and the potential gains for consumer choice and variety. However, one has to balance this with concerns regarding equity between regions, economies of scale, transparency, tax competition and political incentive structures (e.g. 'common pool' problems etc).

Our cross-country comparisons demonstrate that throughout the OECD, sub-central governments play a significant role in the conduct of national fiscal policy. Substantial amounts of expenditure and revenue are assigned to sub-central tiers and their responsible (or irresponsible) use will clearly have an important impact on the well being of the nation as a whole. It seems pertinent therefore, for any study of national fiscal policy to account for the role played by sub-central tiers and to analyse the distinct contributions of the two tiers and the interactions between them.

As highlighted in the main body of the chapter, using recent data, expenditure decentralisation ranges from under 25% in many unitary countries to over 50% in some federations. Of additional interest are the types of expenditure assigned to sub-central tiers. Typically and in line with what the theory would suggest, 'national' public goods such as defence and to a lesser extent, social security, remain largely controlled by central governments. Sub-central expenditure responsibilities tend to be skewed toward the provision of health care, education, housing and recreational services. However, our analysis shows that some countries have devolved relatively high levels of responsibility in certain types of expenditure and relatively lower levels in others. For example, in comparison to other countries, the German education system is one of the most decentralised however, their health care system remains one of the most centralised.

Finally, an observation which is of clear importance is the existence of substantial 'vertical imbalances' across all our sample countries (though to a greater extent in some than others). Such imbalances are the result of sub-central governments having responsibility for expenditure provision that exceeds the revenues that they can raise themselves. This gap in finance is filled by central government transfers. It is clear from the above discussion that while there are recognised benefits from expenditure decentralisation, how such expenditures should be financed is a more complex issue. The scope for sub-central governments to raise revenues themselves is relatively limited given concerns over equity, efficiency of tax collection, harmful inter-state competition etc. Thus, vertical imbalances are themselves desirable. However in practice, vertical imbalances can create difficulties,

none more so than the possible damaging incentives placed upon sub-central politicians. Reliance upon central transfers can erode the accountability of those responsible for policy and decision making at the sub-central tier, encourage fiscal profligacy and over-extraction from the 'Common (National) Pool' of resources and generate 'soft-budget' constraints. The reliance upon central transfers is an important issue, and as will be discussed in future chapters, inter-governmental transfers appear to be a key component in successful national fiscal consolidation attempts.

1.6 References

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1.7 Appendix

1.7.1 – Description of Data

In this appendix we discuss the fiscal and economic data that is used throughout this thesis. All variables unless otherwise stated are from the IMF Government Finance Statistics 2002 database. GFS subject codes are presented in parentheses for reference. Data from the GFS refers to either the Central, Local or State government.

Total Expenditure and Revenue:

Our measure of Total Expenditure is given by the GFS's *Total Expenditure* variable (82) plus Lending minus repayment (83). Total Revenue is given by *Total Revenue plus Grants (81). Grants (81Z)* originate from two main sources – from *National Government* (81ZG) and *Super-National Authorities*, e.g. the EU (81ZA).

Total Deficit (80) is given by *Total Revenue* (81) less *Total Expenditure* (82 + 83).

Composition of Expenditure

We decompose Total Expenditure into the following groups:

a) *Current Expenditure* (82R):

i) *Wages and Salaries* (82NA) and *Employer Contributions* (82NX),

ii) *Other Purchases of Goods and Services* (82NP),

iii) *Subsidies* (82PK) and *Transfers to Non-profit Organisations and Households* (82PT)

iv) *Interest Payments* (82PA),

v) *Transfers to other levels of government* (82PM).

b) *Capital expenditure* (82V) less *Capital Transfers* (82U):

We can also classify expenditure according to economic function. We split up expenditure into the following categories:

1) *Defence* (82B)
2) *Education* (82C)
3) *Health* (82D)
4) *Social Security and Welfare* (82E)
5) *Housing and Local Amenities* (82F)
6) *Public Order and Safety* (82AC)
7) *Recreational and Cultural Services* (82G)
8) *General Public Services* (82B)
9) All other expenditure: *Natural Resource* (81H) and *Other Expenditure* (82K).

Composition of Revenue

Likewise, we can split up Total Revenue in a similar fashion:

1) Direct taxation: *Income Tax* (81A) plus *Taxes on Payroll or Workforce* (81C) plus *Taxes on Property* (81D),
2) *Social Security Contributions* (81B),
3) Indirect taxation: *Domestic Taxes on Goods and Services* (81E) plus *Taxes on International Trade and Transactions* (81F)
4) *Non-Tax Revenues* (81YB),
5) *Capital Revenue* (81YC),
6) *Intergovernmental Grants* (81Z).

In addition to the GFS database, we make use of the OECD Statistical Compendium 2002 Edition for additional data on –

: Debt to GDP ratio: Gross National Debt as a percentage of GDP.

: GDP = Gross Domestic Product (Expenditure approach) at current prices.

: Unemployment = Number unemployed as a percentage of total labour force.

Appendix 1.7.2 – Construction of the 'Index of Fiscal Control' (as used in Figure 1.6)

The 'Index of Fiscal Control' comprises a weighted average index measuring the tax raising autonomy of state and local governments, multiplied by the magnitude of these respective taxation revenues. The weighted average index is based on OECD Tax Policy Study Number 1 (OECD 1999). The weights are as follows –

Table 1.6: Weights for 'Index of Fiscal Control'

Weight	Taxation Autonomy
1	State/Local government free to set both tax rate and tax base.
0.8	State/Local government free to set tax rate only.
0.6	State/Local government free to set tax base only.
0.5	State/Local government able to determine revenue-split in tax sharing arrangement with higher levels of government.
0.4	Revenue split in tax sharing arrangement with higher level of government requires consent of State/Local government.
0.3	Revenue split in tax sharing arrangement is fixed, but can be unilaterally altered by higher level of government.
0.2	Revenue split in tax sharing arrangement is determined by higher level of government in their annual budget.
0	Higher level of government sets both tax rate and base.

For example, for a country with a central and local government structure, e.g. Poland with 45% of taxation in category (b), 1% category (c) and 54% category (d.3), the index is obtained as follows:

Index of Fiscal Control = 0.45*0.8 + 0.01*0.6 + 0.54*0.3 = **0.528**

Alternatively, for a country with a central, state and local government structure, e.g. Switzerland the index takes account of the ratio of state vis-à-vis local taxation revenues:

Communities: 0.97*0.8 + 0.03*0.3 = 0.785
Cantons: 0.89*1 + 0.06*0.4 + 0.05*0.3 = 0.929
Overall Index of Fiscal Control = (16/38)*0.785 + (22/38)*0.929 = **0.868**

Appendix 1.7.3 – Construction of the Borrowing Autonomy Index (as used in Figure 1.7): Source Rodden (2003)

Criteria: Index is bounded between 1 and 5. Higher values = greater freedom to borrow.

Borrowing arrangements -

1) Ability to borrow – can the sub-central government borrow?
   - No = 2 points
   - Yes = 0 points
2) Authorisation – Does borrowing by the sub-central government require central government approval?
   - Yes = 1 point
   - No = 0 points
   - If authorisation required only on certain kinds of debt a value between 0 and 1 is assigned according to the detail of the constraint.
3) Borrowing constraints – Are there numerical constraints on borrowing?
   - Up to 0.5 points depending upon coverage of constraints.

4) Limits on the use of debt – Can debt only be used for 'golden rule' expenditures etc?

- If debt may not be used for current expenditures 0.5 points.

The final value of these four items is equal to 2 minus the sum of the points from criteria 1 through 4. For example, if sub-central governments in a country cannot borrow, the total for this part will be 2-2 = 0.

Additional criteria –

1) Sub-central government banks - Do sub-central governments own banks?

- Yes = 1 point.
- No = 0 points
- Further, depending upon the importance of these banks, up to 0.5 points added.
- If sub-central governments have a special relationship with a bank(s) but do not actually own them = 0.5 points.

2) Public enterprises – Do sub-central governments own public enterprises who in turn have liberal borrowing practices?

- Yes = 0.5 points.
- No = 0 points.

These scores are then added to the value obtained above. One is added so that the final index varies between 1 and 5.

Chapter 2

"Methodology: Identifying and Classifying Fiscal Consolidation Attempts"

2.1. Introduction

As outlined in the Introductory chapter, a primary task of this thesis is to examine the distinct roles of both central and sub-central governments during national fiscal consolidation attempts and to discuss those factors which make certain consolidation attempts more likely to be successful than others. In the final chapter we assess the implications of alternative levels and forms of decentralisation on the consolidation process and empirically test whether decentralisation itself ultimately impacts on the probability of success. To undertake these objectives it is necessary at the outset to outline the methodologies we adopt both to identify consolidation attempts and to measure their success. In this chapter we take time to outline and discuss the techniques applied. In doing so, we also outline some possible alternative approaches and discuss the robustness of our analysis.

We refer to a fiscal consolidation as a large and discretionary attempt by a country/government to improve their fiscal position[1]. Both elements (large *and* discretionary) are necessary requirements of a fiscal consolidation. We are therefore,

[1] In the literature, fiscal consolidations are also referred to as positive fiscal adjustments or fiscal reforms.

interested in examining episodes where there were significant reductions in the fiscal deficit or increases in the fiscal surplus as a direct result of intentional policy shifts.

The outline of the chapter is as follows. In Section 2.2 we discuss the construction of an accurate measure of discretionary fiscal policy, paying particular attention to the approach we have applied, the Blanchard Fiscal Impulse. In Section 2.3, using these measures of discretionary fiscal policy we discuss the identification of fiscal consolidation episodes. In Section 2.4 we shift focus to measuring the relative success of these identified consolidations, while Section 2.5 discuss our methodology to identify sub-central fiscal consolidation attempts. Section 2.6 provides our results and Section 2.5 concludes.

2.2. Measuring Discretionary Fiscal Policy

One of the primary roles of fiscal policy is to act as an automatic stabiliser in response to economic fluctuations. During downturns (i.e. periods of deteriorating economic growth performance), fiscal policy loosens as taxation revenues fall and social transfers (such as unemployment benefits) increase. This in turn has an expansionary effect on the economy, assisting the economy's return to trend output. In contrast, during above trend expansions (i.e. periods of economic growth above 'normal'), fiscal policy tightens as taxation revenues increase and social transfers decrease. This has a stabilising contractionary effect on the economy. The effects of these automatic stabilisers are significant. For the Euro area, it is estimated that a 1%

fall in GDP relative to trend will increase the deficit by around 0.5 percentage points of GDP[2].

Given the endemic fluctuations in the macroeconomy, it is unlikely that fiscal balances will remain constant even without any discretional intervention by fiscal policy makers. However, to examine consolidation attempts we wish to focus solely upon large discretionary changes in government policy. Consequently, a key goal for any study of consolidation attempts is to distinguish between on the one hand, fiscal policy changes originating from macroeconomic fluctuations and intentional policy shifts by governments. When identifying consolidation attempts we wish to be sure that the observed large changes in the fiscal position are the result of distinct policy shifts and are not the result of macroeconomic factors.

Unfortunately however, there is no universally accepted technique for decomposing changes in fiscal policy into its discretionary and non-discretionary components. In fact, the appropriate method to adopt and indeed if there is an appropriate method, has and continues to be, one of the most controversial debates in modern macroeconomics. Throughout the literature, a number of alternative techniques have been proposed each with their respective merits and de-merits. Ultimately, the final decision regarding which approach to adopt will come down to personal preference and the research question being studied. Key concerns include accuracy, transparency and robustness.

[2] Source European Commission (2000), p. 51.

In what follows, we firstly discuss two alternative approaches to obtain a measure of changes in discretionary fiscal policy before outlining in detail our chosen approach, the Blanchard Fiscal Impulse.

2.2.1 Alternative Approaches

It is standard practice in the literature to deduct debt interest payments from the fiscal balance prior to making any calculations of discretionary fiscal policy – i.e. focus upon changes in the primary balance (total fiscal balance – debt interest payments). There are two main reasons for doing this. Firstly, current interest repayments largely reflect the behaviour of past governments. For example, countries that have had fiscally profligate governments in the past will tend to face relatively high debt interest payments. Thus contemporaneous interest payments are an element of current expenditure which has little to do with present day policymakers. Secondly, interest repayments are highly responsive to changes in the macroeconomy and monetary policy. Thus, interest payments may fluctuate widely outside the direct control of the government. For both reasons, it is widely accepted that one should eliminate such effects when attempting to focus upon intentional shifts to consolidate the budgetary position.

To obtain a decomposition into discretionary and cyclical, or structural fiscal policy there are two main methods one can adopt. Firstly, one can adopt a top-down approach. This methodology typically consists of estimating the so-called structural (or cyclically adjusted) budget balance as the residual having purged the actual primary balance of the estimated budgetary consequences of the business cycle.

Having done this, year on year changes in this measurement or changes relative to some base year, can be calculated to obtain a measure of discretionary stance. While the Blanchard Fiscal Impulse estimates the discretionary fiscal stance directly, it also falls into this category of top-down estimation. Secondly, one may adopt a bottom-up approach. Here, one accounts for the budgetary effects of individual policy initiatives on the one hand, and each cyclical influence on the other, thereby, explaining the different causes of the change in the budget balance. While favourable in theory, the primary practical limitations of this approach are the information and data required. Internationally comparable data on a sufficiently large and accurate disaggregated basis simply does not exist. Consequently, all estimation techniques to be discussed in this chapter can be classified as top-down.

2.2.2 The Hodrick-Prescott Filter and Production Function Approaches[3]

In both of these estimation techniques, the measurement of the discretionary (or structural) fiscal impulse proceeds in three steps. Firstly, a reference path for real GDP is calculated. In the Hodrick-Prescott (HP) approach this reference path is trend output[4]. In essence, this trend represents the 'average' growth rate of GDP across the sample. In contrast, under the Production Function (PF) approach the reference path is a direct measure of potential GDP. Potential GDP is the level of GDP which the economy could produce if it were operating at full capacity. Given this estimate of

[3] For a discussion of these two approaches see Chalk (2002).
[4] A related approach to the HP filter which also calculates trend output is the Split-Time Trend (STT) approach. For a survey of this approach see Giorni *et al.* (1995). While once popular with the OECD, the STT approach is no longer used in current research.

either trend or potential output the output gap can be calculated – i.e. the difference between actual GDP and the chosen reference path.

Secondly, using these output gaps, together with the relevant fiscal elasticities, it is possible to estimate the level of government revenues and expenditures that would prevail if output were at the reference path instead of the actual level. Typically, government tax revenues and unemployment-related items of expenditure such are social transfers, are thought to be the most sensitive to changes in GDP, and will respond closely to cyclical fluctuations. Hence, such elements are adjusted in this manner. The resulting estimates of adjusted revenues and expenditures can be used to determine the structural (or cyclically adjusted) budget balance corresponding to the underlying reference path for output. This technique is applied to both central and sub-central government data.

Thirdly, to estimate the discretionary (structural) fiscal impulse, one only need calculate the first difference of this adjusted budget balance. An alternative to examining annual changes or the construction of a structural fiscal balance is to compare the current fiscal position with some pre-determined base year. Typically, this is a year in which actual and potential GDP were very close. One such approach is the IMF approach, see Alesina and Perotti (1995). In this method, the fiscal stance is measured by comparing the current fiscal policy with the base year where by definition the fiscal stance is neutral.

The primary limitation with this three stage approach is the attainment of an accurate measure of the output gap in stage 1. We will discuss this issue in more depth below.

A less serious problem relates to the estimation of average GDP elasticities for government revenues and expenditures in stage 2. In principle, the measurement of the responsiveness of particular budget items to fluctuations in GDP is quite straightforward. The possible instability of the elasticities over time or over the cycle may, however, hamper the reliability of average elasticities. For example, consolidation programmes and tax reforms can change the cyclical sensitivity of budgetary categories in a distinctive manner. Therefore in subsequent post consolidation periods, changes in GDP may not generate the same response in elements of fiscal policy, as had previously been the case.

2.2.2a) The HP Filter

The use of the Hodrick-Prescott (HP) filter to estimate potential output has become commonplace in the macroeconomic literature and needs little introduction[5]. The basic idea of the HP filter is to fit the 'best' trend through observations of actual GDP by means of weighted moving averages[6]. This trend yields the estimate of

[5] See Hodrick and Prescott (1980) and EC (1995).
[6] For a discussion of the use of the HP method to calculate structural budget balances see Roger and Ongena (2002).

'potential' output[7]. To do this, the H-P filter approach decomposes output (Y) in period t into a trend (Y_t^*) and non-trend or cyclical (Y_t^C) component, i.e. –

$$Y_t = Y_t^* + Y_t^C \qquad (2.1)$$

Hodrick and Prescott argued that by minimising a linear combination of the sum of the deviation of Y from its trend (Y*) and the variability of the trend itself, a measure of the trend value of Y (Y*) could be obtained[8], i.e. –

$$\min_{y_t^*} \sum_{t=1}^{T} \left(\left(Y_t - Y_t^* \right)^2 + \lambda \left(\Delta Y_{t+1}^* - \Delta Y_t^* \right)^2 \right) \qquad (2.2)$$

The parameter λ is known as the 'smoothing parameter'. It determines the relative weights attributed to the deviation of Y from trend and the variability of the trend itself. The choice of λ involves a trade-off for the trend between smoothness and fit to actual output. The 'smoother' is trend output, the poorer the fit to actual output and vice versa. Higher values of λ imply a 'smoother' trend: for λ = α the trend is linear. That is, a low of value of λ produces trend output estimates that closely follow actual output and are therefore relatively volatile. A high value of λ produces smoother trend estimates that follow actual output less closely.

[7] Strictly speaking this 'potential' output is in fact trend output and has nothing to with the level of output an economy can actually produce.

[8] It has been shown by King and Rebelo (1992) that applying the HP filter, results effectively in a moving average filter. Each estimate of trend output is calculated by the application of a weighted average, which extends over several years, to the actual output data. The weighting coefficients of the moving averages are fixed so that higher weights are assigned to the years closest to the reference year, i.e. the year for which trend output is calculated. The filter weights are symmetric, i.e. observations in a similar position on each side of the central observation are given equal weights.

The appropriate choice of λ is ultimately at the discretion of the researcher. Some argue that the most appropriate method is to follow Hodrick and Prescott's lead (see Hodrick and Prescott (1980)) and choose a constant ratio of the variances of trend output and actual output. Applied on a cross-country basis, this generates different λ values for each individual country. An alternative is to impose a uniform degree of both smoothness and variance in trend output for each country. Alternatively, one can choose a value of λ that generates a pattern of cycles that are broadly consistent with prior views about past country specific cycles. Such criteria while inherently judgmental are able to incorporate (limited) information about the past. On the downside however, this approach is less transparent than the other two mentioned above.

The primary advantage of the HP filter method is its simplicity, since it only requires data on actual GDP. Given the wide availability of comparable cross-country GDP data, it can generate consistent estimates across countries. It is also highly transparent. In addition when applied correctly, it is widely accepted to give accurate estimates of trend output.

However, the approach does suffer from a number of weaknesses[9]. A common criticism is that applying the filter to non-stationary series can lead to the creation of spurious cycles – i.e. the creation of an economic cycle which does not actually exist. The criticism of spurious cycles is less likely to be a significant concern with sample

[9] For a discussion of the criticisms of the HP filter see Maravall (1995) and St Amant and van Norden (1996).

sizes in excess of 30 observations – see Bouthevillain *et al.* (2001). Moreover, small samples can also suffer from an end-point problem. As the HP filter is a moving-average based method, the trend follows actual GDP more closely at the beginning and end of the estimation period than in the middle. It becomes asymmetrical at the extremes of the series, due to the lack of observations, increasing the weights over the years for which observations are available. Thus the estimates at both the start and end-points of the sample may be biased[10].

The most commonly cited criticism against the HP filter approach, is the arbitrary choice of the smoothness parameter λ. In the literature there is little consensus as to the appropriate value of λ. Baxter and King (1999) show that for annual data, most contemporary studies use a value of $\lambda = 400$ or 100, while for quarterly data the corresponding figure is usually around 1600. Recent studies have argued that for annual data, a value of 400 or 100 is too high. In fact, according to Ravn and Uhlig (2001), a value of 1600 for quarterly data corresponds to a value of 6 to 8 for annual data. Bouthevillain *et al.* (2001) argue that the most effective 'smoothing parameter' is a value of 30, though the European Commission favour a value of 100 (see EC 1995). The failure to reach a consensus on the most appropriate value of smoothing parameter is a major limitation of the HP filter approach.

Further, by moderating the contemporaneous effects of structural breaks and instead, spreading out the effects over several years, any significant breaks in output are typically smoothed over during application of the HP filter. As a consequence, it is

[10] This can be circumvented where possible by adding additional observations (or forecasts) of output outwith the sample to increase the number of observations at the start and end of the series or alternatively truncating the sample having applied the filter.

difficult to single out large and sudden changes in the level of output if the HP filter is applied. Moreover, the construction of trend output generates an inherent symmetry in the series, guaranteeing that output gaps and hence by implication the cyclical components of the budget if constructing a measure of structural balance, sum to zero over time. This may not be entirely appropriate and could lead to a serious misrepresentation of rapid structural changes.

A final criticism often levied against the HP filter method is that it is purely mechanistic and as such it carries no information about the constraints and limitations on output posed by the availability of factors of production or other endogenous influences – i.e. it calculates trend rather than potential output. Thus, the trend output growth projected by the HP filter may be inconsistent with actual changes in capital stock, labour supply or total factor productivity, or it may be unsustainable because of inflationary pressures.

An alternative approach, which calculates an output gap based on deviations in actual GDP from potential GDP, is the Production Function approach.

2.2.2b) The Production Function Approach

The Production Function (PF) approach, by explicitly modelling potential output, has a firmer base in economic theory. Use of the PF methodology has become increasingly popular in recent years in the light of advancements in data collection.

For example, the European Commission has recently replaced the use of the HP filter and adopted their own PF approach – see EC (2002).

To calculate potential output under the production function approach the starting point involves specifying an appropriate functional form for the economy's production function. The usual assumption is of a Cobb-Douglas production function with two productive factors (labour and capital) and constant returns to scale –

$$\ln Y = \ln A + \alpha \ln N + (1-\alpha)\ln K + \ln E \qquad (2.3)$$

Or,

$$y = a + \alpha n + (1-\alpha)k + e \qquad (2.4)$$

where Y is output, N is labour, K is capital, E is total factor productivity and α is the intensity of labour vis-à-vis capital. In order to implement the PF approach it is necessary to have accurate measures (or estimates) of all factors of production. Clearly, while data on K and N are readily available obtaining a measure of total factor productivity (E) is more difficult.

However, for a given value of α, the total factor productivity series, E, can be calculated as the residual from an estimation of equation 2.4. By applying a de-trending technique such as the HP or Kalman filter to this residual it is then possible to obtain a measure of trend total factor productivity (e*). Subsequently, by putting this generated series into the production function, along with the stock of capital (which is assumed to be fully utilised – see EC 2002 for why this assumption is made)

and potential employment (NAIRU), it is possible to obtain a measure of potential output (y^P).

Having calculated potential output, it is then possible to obtain a measure of the output gap and hence estimate the structural fiscal stance.

The main advantage of this methodology is the presence of a sound theoretical foundation and the explicit calculation of potential rather than trend GDP. However, its principle limitation is the depth and spread of data required. To make estimates of potential output, a set of assumptions (e.g. the exact form of the production function to be estimated) and auxiliary estimates are required (e.g. an estimate of total factor productivity, an estimate of the NAIRU and an estimate of the stock of capital). The drawback of this procedure is that the estimates involve several sources of uncertainty and potential estimation and measurement errors, which hamper the reliability of the potential output and output gap estimates. Such issues are likely to be of added concern when one is applying the technique across a number of different countries.

Further, as in the HP approach, the reliability of the estimates of potential output and hence also cyclically adjusted budget balances, are particularly troublesome during periods of a major structural change in the economy. In particular, the assumption that unemployment fluctuates around some stable, or slowly changing, value for NAIRU, or that the production function itself remains stable over time, may be inappropriate. Despite the apparent difficulties, information on structural breaks (e.g. changes in productivity, technology, production structure, capital stock, labour

markets) can be more flexibly incorporated in the production function framework than is the case with the HP trend estimation method.

2.2.3 The Blanchard Approach

An alternative approach to measure fiscal stance, which does not rely on the calculation of potential or trend GDP, is the Blanchard Approach. This methodology was first applied in Blanchard (1990). The Blanchard Fiscal Impulse (BFI) is one of the most popular measures used to obtain an estimate of discretionary changes in fiscal policy applied in the literature and it is our favoured method of estimation.

Unlike the aforementioned techniques, the Blanchard approach estimates the structural fiscal impulse directly rather than the structural balance. It is an indexed approach and can be summarised as follows.

The Blanchard approach is based around the estimation of what government expenditures and revenues would be in any given year if the unemployment rate had remained the same as in the previous year. In undertaking these calculations, only the elements of fiscal policy deemed to be influenced by unemployment fluctuations are adjusted. Thus, as pointed out by Alesina and Perotti (1997), the BFI is essentially a cyclical adjustment that eliminates from the fiscal balance changes in taxes and transfers due to changes in the unemployment rate.

Formally, the calculations we perform are as follows[11]. In the first step, for each country in our sample and for each tier of government (i.e. general, central and sub-central), social transfers and revenues both expressed as a percentage of GDP, are regressed on a time trend (T) and the unemployment rate (U_t) –

$$Tra_t = \alpha_1 + \beta_1 T + \beta_3 U_t + \varepsilon_{1,t} \qquad (2.5)$$

and,

$$\mathrm{Re}v_t = \delta_1 + \phi_1 T + \phi_3 U_t + \varepsilon_{2,t} \qquad (2.6)$$

In line with Blanchard (1990), we choose to only adjust Social Transfers and Revenues (excluding grants) in this manner[12]. In contrast, Brunila and Tujula (1998) adjust all elements of expenditure for the economic cycle.

Next, the level of transfers and revenues that would have existed in period t, had unemployment remained the same as in the previous year (i.e. t-1), are calculated. To do this, the estimated coefficients and residuals from equations (2.5) and (2.6) are used in the following –

$$Tra(U_{t-1})_t = \hat{\alpha} + \hat{\beta}_1 T + \hat{\beta}_2 U_{t-1} + \hat{\varepsilon}_{1,t} \qquad (2.7)$$

and,

$$\mathrm{Re}v(U_{t-1})_t = \hat{\delta}_1 + \hat{\phi}_1 T + \hat{\phi}_3 U_{t-1} + \hat{\varepsilon}_{2,t} \qquad (2.8)$$

[11] See Alesina and Perotti (1995) for a fuller discussion.
[12] Alesina and Perotti (1995 and 1997), Alesina et al. (1998) and Alesina and Ardagna (1998) all adopt an identical approach however, they do not strip out intergovernmental grants given they are using general government data.

Using $Tra_t(U_{t-1})$ and $Rev_t(U_{t-1})$, coupled with the 'non-cyclical' elements of fiscal expenditure (non_cy_exp) and revenue (non_cy_rev) it is possible to compute the primary deficit that would have prevailed in period t had the unemployment rate been equal to period t-1's unemployment rate. That is,

$$Bla\ deficit_t = \left(Tra_t\left(U_{t-1}\right) + non\ cylical\ \exp_t\right) - \left(\mathrm{Re}v_t\left(U_{t-1}\right) + non\ cylical\ rev_t\right) \quad (2.9)$$

Finally, to obtain the Blanchard fiscal impulse, one calculates the difference between this unemployment-adjusted measure of the primary deficit in period t ($Bla\_pri\_def_t$) and the previous year's primary deficit (pri_def_{t-1}).

$$BFI_t = Blan\ primary\ deficit_t - Unadjusted\ primary\ deficit_{t-1} \quad (2.10)$$

The inclusion of a time trend in (2.5) and (2.6) requires further explanation. The use of the time trend is purely a statistical tool to guarantee that the residuals from the estimating regression are stationary. Alesina and Perotti (1995), Alesina and Perotti (1997), Alesina *et al.* (1998) and Dalle Nogare (2003) all use a split time trend, with the sample split into two.

In our analysis we adopt a different strategy for reasons outlined below. Firstly, our sample differs from the aforementioned studies and unlike their sample periods, ours is unbalanced. Thus a uniform split time-trend occurring halfway through the sample is inappropriate.

Secondly and more fundamentally, we believe that the use of a uniform split time trend is rather arbitrary. It implies the existence of a certain trend in revenues and transfers that is identical across all countries (and levels of government) in the sample period. We believe that this is likely to be too restrictive. The pattern of fiscal policy has varied considerably across countries. For example, government expenditures have risen far more sharply in some than in others. In addition, given that we are applying this measure across tiers of government, changes within particular countries would again suggest that a uniform approach is too simplistic.

Thirdly, we believe that alternative time trend specifications will lead to improved estimates. The use of a split time trend implies that there is a distinct kink in the data series. This may or may not be the case in our sample. Use of a split-time trend while able to account for linear trends fairly accurately cannot capture any non-linear trends in the data series. In contrast, quadratic trends can perform well both when there are distinct kinks in the data series and in non-linearities.

Therefore, when estimating equations 2.7 and 2.8 we initially include both a quadratic and a linear time trend -

$$Tra_t = \alpha_1 + \beta_1 T + \beta_2 T^2 + \beta_3 U_t + \varepsilon_{1,t} \qquad (2.11)$$

and,

$$\mathrm{Re}v_t = \delta_1 + \phi_1 T + \phi_2 T^2 + \phi_3 U_t + \varepsilon_{2,t} \qquad (2.12)$$

If the quadratic term is significant and the residuals appear stationary[13], then we adopt this specification[14]. If the quadratic term is insignificant but the residuals are stationary, we check to see whether the linear trend on it's own is sufficient to guarantee stationarity. Thus, we estimate a model, identical to that estimated by Brunila and Tujula (1998) –

$$Tra_t = \alpha_1 + \beta_1 T + \beta_2 U_t + \varepsilon_{1,t} \qquad (2.13)$$

and,

$$\mathrm{Re}v_t = \delta_1 + \phi_1 T + \phi_3 U_t + \varepsilon_{2,t} \qquad (2.14)$$

As before, stationarity is assessed. If non-stationarity is found, we return to the previous specification – equations 2.11 and 2.12. If the linear trend is significant and the residuals are stationary then equations 2.13 and 2.14 are adopted. Finally, if the linear time trend is insignificant but the residuals are stationary, we re-conduct the analysis without time-trends i.e. –

$$Tra_t = \alpha_0 + \beta_2 U_t + \varepsilon_{1,t} \qquad (2.15)$$

and,

$$\mathrm{Re}v_t = \delta_1 + \phi_3 U_t + \varepsilon_{2,t} \qquad (2.16)$$

[13] We check for stationarity by looking at the correlegrams of the residuals and applying unit root tests. For a discussion on stationarity tests and their 'power' see Enders (2003).
[14] At no point do we find a significant quadratic term where the residuals are non-stationary.

If stationarity is found, this was the approach adopted. If not, we return to the previous linear trend specification.

The above approach enables us to choose the most appropriate model specification for each country and each tier of government. In most cases, the quadratic trends perform well. In only 9 (3 at the general government level) out of 95 regressions is the inclusion of a time trend rejected entirely.

The following table contains a list of the time trend specifications adopted for each country and level of government.

Key Q = Linear and Quadratic trend

L = Linear trend only

X = No time trend

Table 2.1: Time-Trend Specifications for Blanchard Fiscal Impulse Calculations

Country	Revenues			Transfers		
	General	Central	Sub-Central	General	Central	Sub-Central
UK	L	X	Q	L	L	Q
Netherlands	Q	Q	L	Q	Q	Q
Ireland	Q	Q	Q	Q	Q	X
France	Q	Q	L	Q	X	Q
Denmark	Q	Q	Q	Q	Q	L
Sweden	Q	Q	Q	Q	Q	Q
Belgium	X	Q	X	L	Q	L
Norway	Q	Q	Q	X	X	Q
Finland	L	L	Q	Q	L	Q
Spain	Q	Q	L	L	Q	L
Australia	Q	Q	Q	X	X	Q
Canada	L	L	Q	Q	L	Q
USA	L	L	Q	L	Q	L
Austria	Q	Q	Q	Q	Q	Q
Germany	L	Q	L	Q	L	Q

The Blanchard approach has a number of advantages. Firstly and most importantly, the measure appears to generate believable results. Alesina and Perotti (1995) report that use of the Blanchard method identifies all well documented episodes of fiscal consolidation previously discussed in the literature. Further, Brunila and Tujula (1998) show that the Blanchard approach captures relatively well the discretionary fiscal impulses in Finland in recent years in comparison to estimates requiring the estimation of potential output[15].

[15] This is shown to be especially evident in comparison to the HP filter approach.

Secondly, the approach is simple and transparent. In addition, it does not require the calculation of potential output, which as discussed above, can be both highly controversial and complicated.

Thirdly, the Blanchard approach does not require the choice of some 'base year' upon which current policy outcomes can be compared. Since Blanchard's indicator focuses on the discretionary changes in underlying fiscal stance, the previous year's budgetary position is used as the benchmark.

Fourthly, under the Blanchard method the results concerning the past orientation of fiscal policy do not change in the course of time provided that the sensitivity of government revenues and expenditures with respect to changes in unemployment are fairly stable over time. As discussed above, unstable expenditure and revenue elasticities can pose difficulties for measures of discretionary fiscal impulses based on estimations of potential output. However, Kearney *et al.* (2000) note that the BFI assumes a stable relationship between changes in unemployment and economic activity, which may not be appropriate (especially during periods of structural change).

Finally, and not necessarily an advantage in itself but an important justification nevertheless, is that the BFI has been the approach adopted in many previous empirical studies of fiscal consolidation attempts. Therefore, in order to best highlight the value added from our study, using the BFI has the benefit of applying consistency between this study and previous work in the literature.

There are however, some limitations with the BFI approach. Firstly, it is not as sophisticated as alternative methods such as the PF approach. However, sophistication does not necessarily imply accuracy and we have found that our use of the BFI generates believable results. In addition, while alternative procedures may exist which give highly accurate point estimates of discretionary and non-discretionary fiscal balances, for our purposes we simply require a method to discriminate between *large* fiscal impulses and all other periods.

Secondly, the Blanchard approach only allows for a distinction between changes in economic conditions that are temporary versus those that are permanent and captured via the inclusion of the time trend(s).

Thirdly, it is also possible to be critical of the use of unemployment as the explanatory variable upon which expenditures are adjusted. As pointed out by Heller (1996), lags in unemployment rates may lead to the results not accurately capturing changes in the cycle. Moreover, the BFI adjusts revenues solely for movements in unemployment despite the fact that important tax bases (e.g. consumption and wages) while cyclical, may not be perfectly correlated with unemployment movements. It is possible, as Brunila and Tujula (1998) have done, to use the real GDP lagged instead of the unemployment rate in the calculation of the BFI though their results do not alter substantially.

Finally, the BFI only captures the effect of the cycle in a linear manner. More complex non-linear aspects of a downturn for example, are not accounted for. Despite these criticisms, the BFI is the primary measure of changes in discretionary fiscal

stance on which we base our identification of fiscal consolidation attempts. To check the robustness of our results we have also identified consolidation attempts based upon changes in the structural balance calculated via the HP filter approach and the use of an estimated potential output 'output gap' supplied by the OECD[16]. As we will demonstrate, our results are relatively robust across all 3 estimation techniques.

2.3. Identifying General Government Fiscal Consolidation Attempts

Having constructed a measure of discretionary changes in fiscal policy for each country, there are two ways of proceeding. The first is simply to use this measure as part of a cross country panel dataset to examine common features which characterise shifts in general government discretionary fiscal policy. However, the problem with this approach is that the measured discretionary fiscal impulse is unlikely to be zero even if there is no discretionary policy action enacted by governments, simply because there is no perfect way of decomposing automatic and discretionary fiscal changes. The risk is that any statistical analysis based on this panel dataset will lack statistical power. A second way of proceeding is to focus on *significant* changes in discretionary fiscal policy. This will ensure that our results are not driven unduly by cyclical changes. The standard approach in the literature is to define some form of subjective criteria which allows one to discriminate between significant changes in discretionary fiscal policy and all other episodes based entirely on the data at hand. Given that there exists neither a fiscal consolidation 'script' which governments follow, or indeed comprehensive and accurate records of government

[16] The OECD output gap is based on the production function approach. For a discussion of its calculation see Giorno *et al.* (1995).

policy shifts to improve their fiscal balances, the use of specific criteria to discriminate between observations is likely to be the most appropriate methodology to adopt.

The use of structural balances and subjective criteria has been popular in the literature. In the following table we list both the subjective criteria used to identify consolidation attempts and the measure of discretionary fiscal policy adopted in a selection of previous studies.

Table 2.2: Fiscal Consolidation Identification & Measures of Discretionary Fiscal Impulse

	Identification of Fiscal Consolidation Attempts	Measure of Discretionary Fiscal Impulse
Alesina & Perotti (1995)	: Annual Fiscal Impulse 1.5% of GDP, or : Annual Fiscal Impulse +1 standard deviation of individual country mean.	BFI
IMF (1993, 1995)	: Improvement in Structural Balance 1.5% of GDP.	IMF Structural Budget Balance
McDermott and Wescott (1996)	: Improvement in Primary Structural Balance 1.5% of potential GDP over two years and not decrease in either year.	OECD & IMF Output Gaps
Cour *et al.* (1996)	: Three-year improvement in Primary Structural Balance 3% of GDP.	OECD Primary Structural Budget Balance
De Menil (1996)	: Annual improvement in Primary Structural Balance 1.5% of GDP.	BFI
Giavazzi and Pagano (1996)	: Accumulated improvement in Primary Structural Deficit 5, 4 & 3% of GDP over 4, 3 & 2 years respectively, or : Annual improvement in Primary Structural Balance 3% of GDP.	OECD Primary Structural Budget Balance
Alesina and Perotti (1997)	: Annual Fiscal Impulse 1.5% of GDP, or : Two-year consecutive Fiscal Impulse 1.25% of GDP.	BFI
Missale *et al.* (1997)	: Annual improvement in Primary Structural Balance 1% of GDP.	OECD Primary Structural Budget Balance
Alesina and Ardagna (1998)	: Annual Fiscal Impulse 2% of GDP, or : Two-year consecutive Fiscal Impulse 1.25% of GDP.	BFI
Alesina *et al.* (1998)	: Annual Fiscal Impulse 1.5% of GDP, or : Two-year consecutive Fiscal Impulse 1.25% of GDP.	BFI
Giavazzi *et al.* (2000)	: Two-year improvement in Fiscal Balance 1.5% of GDP.	OECD Fiscal Balance
Steinherr *et al.* (2000)	: Annual improvement in Primary Deficit 1% of GDP, or : Annual improvement in Primary Surplus 0.5% of GDP.	Ameco Database, EC Ecfin
Kamps (2001)	Two-year improvement in Structural Budget Balance 1.5% of potential GDP.	OECD Structural budget balance
Von Hagen *et al.* (2001)	: Two-year consecutive improvement in Cyclically Adjusted balance 1.25% of cyclically adjusted GDP, or : Annual improvement in Cyclically Adjusted Balance 1.5% of cyclically adjusted GDP provided Balance did not deteriorate in following year.	Cyclical adjustments based on a linear-quadratic time trend.
Mulas-Granados (2002)	: Annual improvement in cyclically adjusted budget balance 1% of GDP	HP Filter
Lambertini and Tavares (2003)	: Annual improvement in Primary Balance 1.5% of GDP.	OECD Primary deficit (not cyclically adjusted)
Purfield (2003)	: Annual improvement in Primary Balance 2% of GDP, or : Two-year consecutive improvement in Primary Balance 1.25% of GDP	Unadjusted Primary Balance
EC (2003 a and b)	: Annual Fiscal Impulse 2.0% of GDP, or : Two-year consecutive Fiscal Impulse 1.5% of GDP.	HP Filter

As the above table highlights, a number of alternative methodologies have been applied in the literature to identify 'significant' consolidation attempts. Typically, most studies define a 'significant' consolidation attempt as having taken place if the measure of discretionary fiscal policy improves by at least 1% of GDP; the most common requirement is around 1.5% of GDP. However, whether this improvement is required to occur in one, two or more years differs from study to study. In addition, Table 2.2 shows the alternative methods of measuring discretionary fiscal policy. Alesina and co-authors rely on the BFI measure while organisations such as the IMF and the OECD unsurprisingly base their analysis on their own measurements of the structural fiscal balance. While general government structural balances are widely available, neither the IMF nor the OECD construct such structural measures for central and sub-central units separately. Therefore, we have to rely on constructed measures of discretionary fiscal impulse as outlined in Section 2.2.

In what follows, to remain consistent with the seminal paper in the field, Alesina and Perotti (1995), our primary analysis is based upon the following criteria for identifying general government consolidation attempts.

Definition 1:

A period of fiscal consolidation is deemed to have occurred in a given year if the discretionary fiscal impulse is greater than or equal to +1.5 percent of GDP.

A limitation of Definition 1 is that we cannot account for more gradual consolidations that involve small changes over longer time horizons. As Table 2.2 shows, other studies have tried to circumvent this problem by allowing for two-year

consolidations. To test the robustness of our results we checked to see how our results altered if Definition 1(a) is applied instead.

Definition 1(a):

A fiscal consolidation will have deemed to have taken place if (1) a one year period, where the primary structural balance decreases by at least 1.5 percent of GDP or (2) a two year period where the primary structural balance decreases at least 1.25% of GDP[17].

Even in applying Definition 1(a), there is the possibility that we may fail to capture consolidation attempts which take place over a number of years. However, while acknowledging this criticism, use of even more liberal criteria may lead us to include episodes that merely represent cyclical or automatic shifts in fiscal flows. Illera and Mulas-Granados (2002) explicitly look at the duration of consolidation attempts in the EU. They measure the time span between two consecutive years of discretionary fiscal expansion, or in other words, the number of years between the beginning and the end of a fiscal consolidation[18]. They find that 46% of all identified consolidation attempts lasted one year, 21% two years, 13% three years and 20% lasted four years or more. By focussing upon Definition 1 (and to a lesser extent Definition 1(a)) we can be reasonably confident that the majority of actual consolidation attempts will be accurately identified by our methodology.

[17] Definition 1(a) is consistent with that adopted in Alesina *et al.* (1998) and Alesina and Perotti (1997).
[18] Their measure of discretionary fiscal policy stems from application of the HP filter.

2.4. Identifying Successful Consolidation Attempts

Having identified fiscal consolidation attempts, these episodes can be classified into successful and unsuccessful attempts. Undertaking a consolidation is one thing, ensuring that it generates long-term improvements in the fiscal position is another[19]. When identifying consolidation attempts, the standard approach in the literature to classify success, has been to define certain subjective criteria upon which each identified consolidation can be assessed.

In the following table we list the various criteria that have been applied in previous studies.

[19] For a discussion of recent 'success rates' of fiscal consolidations, see OECD (2002) and EC (2002).

Table 2.3: Measuring Success

	Definition of success
Alesina & Perotti (1995)	: Debt to GDP ratio 3 years after consolidation attempt (i.e. T+3) 5% of GDP lower than in year of consolidation attempt (i.e. T).
McDermott and Wescott (1996)	: Debt to GDP ratio 3 years after consolidation attempt (i.e. T+3) 3% of GDP lower than in year of consolidation attempt (i.e. T).
Alesina and Perotti (1997)	: Debt to GDP ratio 3 years after consolidation attempt (i.e. T+3) 5% of GDP lower than in year of consolidation attempt (i.e. T). : Cyclically Adjusted Primary Balance 3 years after consolidation attempt (i.e. T+3) is on average 2% of GDP healthier than in year of consolidation attempt (i.e. T).
Alesina and Ardagna (1998)	: Debt to GDP ratio 3 years after consolidation attempt (i.e. T+3) 5% of GDP lower than in year of consolidation attempt (i.e. T). : Cyclically Adjusted Primary Balance 3 years after consolidation attempt (i.e. T+3) is on average 2% of GDP healthier than in year of consolidation attempt (i.e. T).
Alesina *et al.* (1998)	: Debt to GDP ratio 3 years after consolidation attempt (i.e. T+3) 5% of GDP lower than in year of consolidation attempt (i.e. T). : Cyclically Adjusted Primary Balance 3 years after consolidation attempt (i.e. T+3) is on average 2% of GDP healthier than in year of consolidation attempt (i.e. T).
Steinherr *et al.* (2000)	: Average annual growth rate of (real) labour productivity is higher in the 5 years following consolidation attempt (i.e. T+1 to T+5) than in previous 5 years (i.e. T-5 to T).
Von Hagen *et al.* (2001)	: Two years after consolidation attempt (i.e. T+2) the government budget balance 75% of balance in year of consolidation attempt (i.e. T).
Purfield (2003)	: Average Primary Fiscal Balance two years after consolidation is 2% lower than in two years prior to adjustment.
Lambertini and Tavares (2003)	: Debt to GDP ratio 2 years after consolidation attempt (i.e. T+2) 3% of GDP lower than in year of consolidation attempt (i.e. T). : Primary deficit remains constant in 2 years after consolidation attempt (T+1 & T+2).
Ardagna (2004)	: Debt to GDP ratio 3 years after consolidation (i.e. T+3) 3% of GDP lower than in the year of consolidation (i.e. T).

Virtually all previous studies use post-consolidation fiscal performance as a basis for measuring the success or failure of consolidation attempts. The change in the debt to GDP ratio is most often used, though changes in the structural balance have also been considered. The use of fiscal policy as the sole measure of success can be justified on the grounds that in most instances the primary motivation for undertaking a consolidation attempt has been to improve the national fiscal position[20]. As can be

[20] It is possible that a government's motivation for implementing a consolidation attempt may be something other than addressing the debt to GDP ratio. For example, targeting the exchange rate, addressing output gap concerns etc. However, even if this is the case for some observations, the performance of debt to GDP ratios in the immediate aftermath of consolidation will remain a good 'proxy' of success.

observed from Table 2.3 Steinherr *et al.* (2000) is the only paper which does not use fiscal policy to measure success.

To retain consistency with Alesina and Perotti (1995), for the most part our analysis is based on the application of the following definition of success –

Definition 2:

A fiscal consolidation is successful if three years after the last year of the consolidation, the ratio of debt to GDP is at least five percentage points below the level observed immediately prior to the consolidation attempt.

In addition to Definition 2, in line with Alesina and Perotti (1997) and Alesina *et al.* (1998), we check the robustness of our results by applying a variant which in addition to changes in debt to GDP, also measures success according to changes in the structural primary balance. This we term Definition 2(a).

Definition 2(a):

A fiscal consolidation is successful if

1) three years after the last year of the consolidation, the ratio of debt to GDP is at least five percentage points below the level observed immediately prior to the consolidation attempt.

2) in the three years after the last year of the consolidation, the cyclically adjusted primary balance is on average at least 2 percentage points of GDP greater than the level observed immediately prior to the consolidation attempt.

The above definitions of success do not take into account the differential effort that would be required by governments to reduce their debt to GDP ratio given their

differing initial (pre-consolidation) conditions. If a government manages to stabilise its debt to GDP ratio from a previously explosive path it seems reasonable to view this as a relatively successful outcome. To better capture relative success, and to discriminate across a range of alternative outcomes following a consolidation attempt, we construct a more refined success index defined below. In the analysis that follows, we present our results based on both Definitions 2 and 3.

Definition 3:

An index of success/failure, SI, is classified as follows:

SI = 3	if the level of the debt to GDP ratio falls by at least 5 percentage points in the three years following a consolidation attempt (equivalent to "success" in Definition 2).
SI = 2	if the level of the debt to GDP ratio stabilises (within half a percentage point tolerance of the initial level rate) or if it decreases by less than 5 percentage points over the three years following a consolidation attempt.
SI = 1	if the growth rate of the debt to GDP ratio over the three years following a consolidation attempt is less than that observed in the three years prior to the consolidation attempt (here we use a tolerance of 10% of the initial growth rate).
SI = 0	if none of the above apply the attempt is classified as a failed consolidation attempt.

While the above index is also subjective, we believe that it is more effective in discriminating between alternative outcomes following consolidation. Such an approach no longer equates consolidation attempts that bring about cuts in debt to

GDP ratios which nevertheless do not exceed 5% of GDP, as equivalent to attempts which are completely reversed.

2.5. Identifying Sub-Central Consolidation Attempts

It seems likely that the majority of consolidation episodes are instigated at the level of central government. However, our dataset also allows us to identify consolidation attempts made by the sub-central tier of government. Given the smaller scale of sub-central budgets it is necessary to adapt Definition 1 for use at the sub-central level:

Definition 4:

A period of sub-central fiscal consolidation is deemed to have occurred in a given year if the weighted discretionary fiscal impulse is greater than or equal to +1.5 percent of GDP or if the weighted discretionary fiscal impulse exceeds 1.25 percent of GDP for two consecutive years.

The weight applied in each case is the sub-central tier's percentage share of general government expenditure.

We allow for two-year consolidations at the sub-central level given the relatively small size of this tier and the likelihood that in practice such consolidations are likely to be more gradual than those at the centre. We attempted to allow for only single year sub-central consolidations and full results are available on request. Degrees of freedom become relatively small however, and although our results remain robust, obtaining statistical inference with such limited observations is more difficult.

In characterising the success of sub-central consolidation attempts we are unable to measure success based upon changes in sub-central debt ratios as such data is not available on a cross-country comparative basis. In addition, even if this data existed, sub-central debt data is highly dependent on central government controls and hence may change for reasons other than sub-central fiscal policy shifts. Instead we judge success on the basis of prolonged improvements in the structural fiscal balance of the sub-central tier of government.

Definition 5:

A period of sub-central fiscal consolidation is deemed successful if over the following three years, the Blanchard structural fiscal balance is on average, as good as or better than in the consolidation year.

2.6 Identified Consolidation Attempts and their Levels of Success

2.6.1 General Government Consolidation Attempts

Table 2.4 lists the years in which we have identified consolidation attempts at the general government level based upon Definition 1 together with those which we deem to be successful using Definition 2.

Table 2.4: Identified General Government Consolidation Attempts and Success		
	Year of Attempted General Government Consolidation	Year of Successful General Government Consolidation
Australia	1982, 96 & 98	1996 & 98
Austria	1984	-
Belgium	1982, 85, 86 & 94	1994
Canada	1982, 87, 95, 96 & 97	1996 & 97
Denmark	1983, 84 & 86	1983 & 84
Finland	1976, 81, 84, 88 & 93	-
France	87 & 97	-
Germany	1976, 77 & 82	-
Ireland	1976, 83, 84, 87, 88 & 89	1987, 88 & 89
Netherlands	1983, 85, 88, 91 & 93	-
Norway	1981, 83, 89, 90 & 94	1981 & 94
Spain	1985, 86 & 97	1997
Sweden	1981, 82, 83, 84, 87, 92, 94, 95 & 96	1984, 87 & 96
UK	1976, 77, 87, 88, 96, 97 & 98	1976, 77, 87, 88, 97 & 98
USA	-	-
Total	**61**	**22**

By applying the methodology outlined above we identify 61 general government consolidation attempts. As might be expected, nearly all (59 out of 61) general government consolidation attempts are either led by central government or involve both tiers of government simultaneously. There are only 2 cases in which the sub-central tier consolidated when no consolidation effort could be identified at the central tier.

It is useful to note that a number of episodes that have been discussed at length in the existing literature are represented, including the UK in the late 1990s, and Denmark and Ireland in the early and late 1980s respectively. For studies of these consolidation efforts see for example, Dornbusch (1989), Giavazzi and Pagano

(1990), Bradley and Whelan (1997), Lambertini and Tavares (2003) and Hjelm and Johansson (2002).

In the third column we indicate the dates of successful consolidation attempts, as classified using Definition 2 above. Of a total of 61 attempted consolidations, 22 (36%) are classified as successful. Further, 27 general government consolidation attempts involve consolidation at the sub-central tier, of which 12 (44%) are judged successful. There are several sustained periods of consolidation (including the UK 1996-1998, Ireland 1987-1989 and Sweden 1981-1984) and it is noticeable that successful consolidations tend to occur close to, i.e. within a two to three year period of, other attempted consolidations.

In Table 2.5 we list the number of consolidation attempts and the relative success rates of these consolidations (as measured by the Success Index) for the countries in our study.

Table 2.5: Consolidation Attempts, Success Rates and Discretionary Expansions[1]

	Sweden	UK	Ireland	Finland	Norway	Canada	Netherlands	Belgium	Denmark	Australia	Spain	Germany	France	Austria	USA	**Total**
Number of attempts	9	7	6	5	5	5	5	4	3	3	3	3	2	1	0	**61**
Success index (SI)	1.9	2.9	1.7	0.6	1.6	1.8	1.6	1.5	2.7	2	2.3	1	1	0	0	**1.5**
Number of expansions	2	6	4	6	4	2	2	1	3	2	1	2	2	3	1	**41**

[1] We identified discretionary fiscal expansions in a symmetric manner to consolidations. That is, a discretionary expansion was deemed to have occurred if the fiscal impulse was at least 1.5% of GDP.

It is apparent that certain countries have attempted to consolidate more frequently than others, notably the Scandinavian countries (Norway, Denmark, Finland and Sweden), though these attempts have not always been successful. A relatively large number of identified consolidation attempts and discretionary expansions took place in Denmark, the UK, Ireland, Finland and Norway. However, these countries are not uniformly associated with low rates of success: Denmark and the UK record relatively high success rates; but conversely Finland and Norway experienced relatively large numbers of discretionary adjustments with relatively low success rates. It has been hypothesised by Alesina and Perotti (1995) that certain countries appear to engage in 'stop-go' policies and this may be one explanation for the relative success and failure of consolidation attempts. They show that in the immediate aftermath of a consolidation attempt, a significant expansion can be observed from the data. We find some evidence to support this hypothesis for two of our countries – Finland and Norway.

As a quick check of the relative performance of the two different types of political structures, unitary and federal, we can divide our countries into two groups. The unitary countries are the UK, France, the Netherlands, Belgium, Ireland, Norway, Denmark, Sweden and Finland. Our group of federations are the USA, Canada, Germany, Austria, Spain and Australia. It would appear that unitary countries have engaged in more consolidations than their federal counterparts. Out of the total number of attempts identified, 15 relate to federal countries and 46 to unitary countries. These consolidation attempts lead to consolidation ratios of 12% for federal countries and 23% for unitary ones. Overall there is little difference between the success rate of 33%, achieved in federal countries and that of 37%, achieved in

unitary countries. Table 2.5 shows the distribution of successful consolidations across countries. Among unitary countries the average value of the success index is 1.72 while among the federal countries it is 1.18[22].

In the following table we assess the extent to which our consolidation attempts are re-classified as successful or unsuccessful if we use Definition 2(a) instead of Definition 2.

Table 2.6: Comparison of Success Measures

	Definition 2	Definition 2(a)	Consolidations in 2(a) and not in 2
USA	None	None	None
UK	1976, 77, 87, 88, 97 & 98	1976, 77, 87, 88, 96, 97 & 98	1996
Austria	None	None	None
Belgium	1994	1985 & 94	1985
Denmark	1983 & 84	1983 & 84	None
France	None	None	None
Germany	None	None	None
Netherlands	None	None	None
Norway	1981 & 94	1981 & 94	None
Sweden	1984, 87 & 96	1983, 84, 87, 94, 95 & 96	1983, 94 & 95
Canada	1996 & 97	1995, 96 & 97	1995
Finland	None	None	None
Ireland	1987, 88 & 89	1987, 88 & 89	None
Spain	1997	1985 & 97	1985
Australia	1996 & 98	1996 & 98	None
Total	**22**	**29**	**7**

Using this alternative measure of success forces us to re-classify only seven observations as successful as opposed to unsuccessful. Thus, the ratio of successful

[22] Of course it is possible that one reason why federal countries may engage in consolidations less frequently is because they run healthier fiscal positions in 'normal' times.

consolidations to unsuccessful consolidations across the whole sample increases. We find that the overall ratio stands at roughly 50% (29 successful, 30 unsuccessful and 2 unclassified). Thus we can be relatively confident that according to our definition of success, our analysis is robust.

Using our more refined success index, 22 general government consolidation attempts achieved the toughest criterion of a fall in the debt to GDP ratio that exceeded 5 percentage points (SI = 3); 12 resulted in a stable debt to GDP ratio or a decline of less than 5 percentage points (SI = 2); 17 attempts resulted in a reduction in the growth rate of the debt to GDP ratio, so satisfied our weakest definition of success (SI = 1) and the remaining 10 of the 61 consolidation attempts fell in the failed category (SI = 0).

Finally, it's worth examining the behaviour of the European countries in our sample in the run-up to the launch of EMU. During this period the Maastricht criteria was seen by some as having helped more lax governments in providing a credible 'political pre-commitment' to the objective of reducing structural budget deficits. We can offer limited support to the success of this forced discipline. Of the EMU countries included in our sample, five made significant adjustments in the post-Maastricht period (Belgium 1994, France 1997, the Netherlands 1993, Finland 1993 and Spain 1997); Germany and Ireland did not make significant consolidation attempts during the 1990s, though at this stage they already had deficit and debt ratios very close to, or within the thresholds set[23].

[23] In the case of Austria, our sample ends in 1994 and hence we are unable to detect any discernible effects attributable to the Maastricht criteria.

In Table 2.7 we compare our identified consolidation attempts with those obtained from a) the Alesina and Perotti (1995) study whose methodology we have followed and b) the consolidation attempts identified using Definition 1 but where the measure of discretionary fiscal impulse is obtained via use of the HP filter (with a smoothing parameter of 30 and 100[24]) and the OECD's Output Gap. The OECD's Output Gap is calculated via a PF approach and hence we are able to compare our results obtained from using the BFI with the two main alternative approaches discussed in Section 2.2[25].

[24] A value of 30 is that favoured by Boutevillian *et al.*, while a value of 100 by the EC.
[25] Note that the Alesina and Perotti (1995) study's sample ends in 1992.

Table 2.7: Comparison of Identified Consolidation Attempts According to Measure of Discretionary Fiscal Impulse

Country	Blanchard Fiscal Impulse	Alesina & Perotti (1995)	OECD Output Gap	HP Filter (λ=30)	HP Filter (λ=100)
USA	-	-	1982	-	-
UK	1976, 77, 87, 88, 96, 97 & 98	1977 & 1988	1976, 77, 80, 81, 96 & 98	1976, 77, 80, 81, 96 & 98	1976, 77, 80, 81, 96 & 98
Austria	1984	1977 & 1984	1984	1984	-
Belgium	1982, 85, 86 & 94	1982 & 84	1982, 85, 86 & 94	1982, 85, 86, & 94	1982, 85, 86, & 94
Denmark	1983, 84 & 86	1983, 84, 85 & 86	1983, 84 & 86	1980, 81, 83, 84, 86 & 93	1980, 83, 84, 86, 92 & 93
France	87 & 97	None	1980, 87, 96 & 97	1980, 87, 96 & 97	1980, 87, 96 & 97
Germany	1976, 77 & 82	1976 & 89	1976, 77, 89 & 94	1976, 77 & 89	1976, 77 & 89
Netherlands	1983, 85, 88, 91 & 93	1985 & 91	1982, 91, 93 & 96	1991, 93 & 96	1991, 93 & 96
Norway	1981, 83, 89, 90 & 94	1979, 80, 83, 84, 89 & 90	1981, 85, 90, 94 & 95	1981, 90, 94 & 95	1981, 90, 94 & 95
Sweden	1981, 82, 83, 84, 87, 92, 94, 95 & 96	1983, 84 & 87	1981, 82, 87, 92, 95, 96 & 97	1981, 82, 83, 87, 92, 96 & 97	1981, 87, 92, 96 & 97
Canada	1982, 87, 95, 96 & 97	1981	1986, 87, 94, 95, 96 & 97	1986, 87, 95, 96 & 97	1986, 87, 94, 95, 96 & 97
Finland	1976, 81, 84, 88 & 93	1973, 76, 84 & 88	1988 & 93	1975, 88 & 93	1975, 88 & 93
Ireland	1976, 83, 84, 87, 88 & 89	1984, 87, 88 & 89	1984, 87, 88, 89, 90 & 97	1976, 77, 83, 84, 87, 88, 89 & 97	1976, 77, 84, 87, 88, 89, 90, & 97
Spain	1985, 86 & 97	1986 & 87	1985, 86, 95 & 97	1985, 86 & 97	1985, 86 & 97
Australia	1982, 96 & 98	1987	1988, 96 & 98	1982, 86 & 96	1982 & 96
Number	**61**	**35**	**60**	**60**	**57**

As can be observed from the above table, our results are relatively robust across all methods. Firstly, the dates in the first column are broadly similar to those reported in Alesina and Perotti (1995), allowing for the difference in our sample period and for minor revisions to the published data. Secondly, while not identical, similar episodes are identified when using our alternative measures of discretionary fiscal policy, the HP filter and the PF approaches. It is unlikely that we will achieve entirely consistent results given the differences in estimation between the BFI and the two output gap measures, however, we can be reasonably satisfied that the episodes identified by the various approaches are consistent with one another. Very few major discrepancies emerge, with small revisions in dates for France, Netherlands, the UK and Norway appearing to be the only differences.

In addition, we can compare the identified episodes in Table 2.4 with those obtained if one replaces Definition 1 with Definition 1(a) – i.e. identification of consolidation attempts over two years. Our results are presented in Table 2.8. For two-year consolidation attempts the last year of consolidation is referenced.

Table 2.8: Comparison of Identified Consolidation Attempts Definition 1 vs. Definition 1(a)

Country	Definition 1	Definition 1(a)
USA	-	-
UK	1976, 77, 87, 88, 96, 97 & 98	1977 (two years), 1988 (two years), 1997 (two years) & 1998 (two years)
Austria	1984	1984
Belgium	1982, 85, 86 & 94	1982, 1986 (two years), 1987 (two years) & 1994
Denmark	1983, 84 & 86	1984 (two years) & 1986
France	1987 & 97	1987 & 1997 (two years)
Germany	1976, 77 & 82	1977 (two years) & 1982
Netherlands	1983, 85, 88, 91 & 93	1983, 1985, 1988, 1991 & 1993
Norway	1981, 83, 89, 90 & 94	1981, 1983, 1990 (two years) & 1995 (two years)
Sweden	1981, 82, 83, 84, 87, 92, 94, 95 & 96	1982 (two years), 1983 (two years), 1984 (two years), 1987, 1992, 1995 (two years) & 1996 (two years)
Canada	1982, 87, 95 96 & 97	1982, 1987, 1995 (two years), 1996 (two years) & 1997 (two years)
Finland	1976, 81, 84, 88 & 93	1976, 1981, 1984, 1988 & 1993
Ireland	1976, 77, 83, 84, 87, 88, & 89	1977 (two years), 1983 (two years), 1984 (two years), 1988 (two years) & 1989 (two years)
Spain	1985, 86 & 97	1986 (two years) & 1997
Australia	1982 & 96	1982, 1996 & 1998

Again, our results appear to be robust to the use of Definition 1(a). For the most part, similar periods are identified as consolidation attempts. In using Definition 1(a) only 6 additional years were identified as consolidations[26].

In summary, we are confident that the methodology we have applied to identify general government fiscal consolidation attempts and measure their respective success is robust. In comparing our favoured methodology with alternative

[26] The six additional years are Belgium (87), Canada (94), France (96), Ireland (77 & 82) and Norway (95).

approaches both to measure discretionary fiscal policy and to discriminate between consolidation attempts and all other periods, similar years are identified. However, to ensure that our analysis is not unduly influenced by the preferred method of identification of such episodes, we re-conduct our core Chapter 4 analysis using these additional methods in an Appendix.

2.6.2 Sub-Central Government Consolidation Attempts

Having analysed general government consolidations we now turn to discuss the episodes where we have identified sub-central consolidations. In applying Definition 4 to the Blanchard Fiscal Impulse constructed for the sub-centre, the years listed in Table 2.9 have been identified as 'significant' consolidation attempts. In addition, Table 2.9 also contains a list of the identified general government consolidation attempts discussed above in order to identify those years in which sub-central consolidations have contributed to overall general government consolidations. The final column displays those sub-central consolidation attempts that we deem to have been successful – see Definition 5.

Table 2.9: Identified Sub-Central Government Consolidation Attempts				
	Year of Attempted General Government Consolidation	Year of Attempted Sub-Central Government Consolidation	Of which, collaboration between tiers	Year of Successful Sub-Central Government Consolidation
Australia	1982, 96 & 98	1996*	1996	-
Austria	1984	1977, 80 & 88	-	-
Belgium	1982, 85, 86 & 94	1982, 83, 84, 85, 91 & 95	1982, 85 & 94/5	1982, 83 & 84
Canada	1982, 87, 95, 96 & 97	1982, 87, 93 & 94	1982, 87 & 94/5	1993 & 94
Denmark	1983, 84 & 86	1983	1983/4	-
Finland	1976, 81, 84, 88 & 93	1975, 88 & 89	1975/6 & 88/9	-
France	87 & 97	1980 & 86	1986/7	-
Germany	1976, 77 & 82	1976, 77 & 98**	1976,77	1976
Ireland	1976, 83, 84, 87, 88 & 89	1976, 77, 83 & 87	1976,77,83,87	1976 & 83
Netherlands	1983, 85, 88, 91 & 93	1976, 81, 82, 83, 88 & 89	1983, 88/9	1976, 81, 88 & 89
Norway	1981, 83, 89, 90 & 94	1981, 90 & 94	1981, 90 & 94	1981
Spain	1985, 86 & 97	1983, 87 & 92	1986/7	1992
Sweden	1981, 82, 83, 84, 87, 92, 94, 95 & 96	1995, 97* & 98**	1995 & 96/97	1997
UK	1976, 77, 87, 88, 96, 97 & 98	1975, 76, 77, 81 & 92	1976 & 77	1975 & 76
USA	-	-	-	-
Total	**61**	**47**	**27**	**17**

Notes:

* Consolidations with only two observations to determine success.

** Consolidations with insufficient observations to determine success.

We identify 47 sub-central government consolidation attempts of which 17 (36%) are deemed successful. 27 of the sub-central consolidations took place in years where there were wider general government consolidations.

Sub-central consolidations were frequent in certain countries such as Belgium and the Netherlands. Others, including Sweden, which engaged in general government consolidations on a number of occasions, (see Table 2.4) engaged in sub-central consolidations relatively less frequently. We find little evidence of a Maastricht effect at the sub-central government level. For the EMU countries, there were only six sub-central consolidations in total during the post-Maastricht period, four of those occurring in Sweden and the Netherlands. This suggests that the 'Maastricht effect' may have been more of an issue at the central/general level rather than at sub-centre tiers.

Successful consolidations tend to be shared amongst certain countries such as Belgium and the Netherlands. Interestingly, most successful consolidations at the sub-central tier appear to have occurred in the pre-1990s period.

Finally, in Table 2.10 we test the robustness of our identification of sub-central consolidation attempts by comparing the episodes listed in Table 2.4 with those obtained using the HP filter (with a smoothing parameter of 30 and 100) and the OECD's Output Gap.

Table 2.10: Identified Consolidation Attempts				
	Blanchard Fiscal Impulse – see Table 2.4	**OECD Output Gap**	**HP Filter (λ=30)**	**HP Filter (λ=100)**
Australia	1996	1996	1996	1988, 89 & 96
Austria	1977, 80 & 88	1977 & 88	1977	1977 & 88
Belgium	1982, 83, 84, 85, 91 & 95	1982, 83, 84, 85, 91 & 95	1983, 84, 85, 91, 94 & 95	1983, 84, 85, 89, 91, 94 & 95
Canada	1982, 87, 93 & 94	1982, 83, 87, 93 & 95	1982, 83, 87, 93 & 95	1982, 83, 87, 93, 94 & 95
Denmark	1983	1983	1983	1983
Finland	1975, 88 & 89	1988 & 93	1975, 88, 89 & 93	1975, 88 & 93
France	1980 & 86	1984, 89 & 95	1988, 89 & 93	1983, 84, 89 & 95
Germany	1976, 77 & 98	1976, 77, 83 & 98	1976, 77, 83 & 98	1976, 77, 83, 91 & 98
Ireland	1976, 77, 83 & 87	1987	1976, 77, 83, 84 & 87	1976, 77, 83, 84 & 87
Netherlands	1976, 81, 82, 83, 88 & 89	1976, 81, 82, 84, 88, 89, 95 & 97	1976, 77, 81, 82, 88 & 89	1976, 77, 81, 82, 88, 89, 95 & 97
Norway	1981, 90 & 94	1981, 85, 90 & 94	1981, 84, 85, 90, 94 & 96	1981, 85, 90, 94 & 96
Spain	1983, 87 & 92	1983, 87 & 88	1983, 87, 88 & 92	1983, 87, 88 & 92
Sweden	1995, 97 & 98	1995, 96 & 98	1992, 95, 96 & 98	1992, 95, 96 & 98
UK	1975, 76, 77, 81 & 92	1975, 76, 77, 81 85, 86 & 92	1975, 76, 77, 81, 85 & 92	1975, 76, 77, 81, 85, 86 & 92
USA	-	-	-	-
Total	**47**	**50**	**56**	**64**

Again, as the above table shows our results are generally robust to alternative measures of discretionary fiscal impulse. For the most part, similar episodes of sub-central consolidation are identified by the four different methods. The HP filter with a smoothing parameter of 100, generates the highest number of observed consolidation attempts while our favoured method based on the BFI, the fewest. As for our general government analysis, in the following chapter we show that our analysis of sub-central consolidation attempts are not unduly influenced by any small influences in identified consolidation attempts.

2.7 Conclusion

In this chapter we have outlined our methodology to identify both general and sub-central government consolidation attempts. We have shown that there are a number of alternative strategies each with their respective strengths and weaknesses.

In attempting to identify fiscal consolidation attempts, it is necessary at the outset to obtain an accurate measure of changes in discretionary fiscal policy. One such approach is to obtain a measure of the output gap from which an estimate of the structural (i.e. discretionary) fiscal balance can be made. To obtain the output gap one method is to apply the HP filter to the series of GDP. In doing so, it is possible to split up movements in GDP into both trend and non-trend elements. The difference between actual GDP and this estimated trend GDP is the HP estimate of the Output Gap. While this approach has a number of advantages including its simplicity and transparency it does however, suffer from a number of weaknesses. Two of its main limitations are its lack of sound economic theory and the arbitrary choice of the 'smoothing parameter'. An alternative, is to estimate potential GDP via some form of Production Function approach. The difference between this estimate and actual GDP also yields a measure of the output gap. While this approach is underpinned by firmer economic theory, it is less transparent and directly comparable data on a cross-national level can be difficult to obtain.

In contrast, our favoured approach the Blanchard Fiscal Impulse, does not require the measurement of potential output. Instead it relates changes in current fiscal

policy to previous periods unemployment rates. It is highly transparent, accurate and is used widely in the fiscal consolidation literature.

Having obtained a measure of discretionary fiscal policy, we have discussed the actual identification of a consolidation attempt, citing a number of alternative strategies one can adopt. Our chosen methodology identifies 61 general government and 47 sub-central fiscal consolidation attempts. As discussed, not all consolidation attempts are successful and we are able to sub-divide our consolidations according to their post-consolidation fiscal performance. Around 1/3 of our general consolidations are deemed to have been successful, while the figure is slightly lower for sub-central consolidation attempts.

Much of the analysis in subsequent chapters uses the identification of consolidation attempts and their classification of success discussed in this chapter. Given the robustness of our analysis to alternative identification techniques, we are confident that our results are not unduly sensitive to the methodology we have applied.

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CHAPTER 3

"Fiscal Consolidation and Fiscal Decentralisation: A Tale of Two Tiers[1]"

3.1. Introduction

This chapter contributes to the established literature on fiscal consolidations by investigating the distinct behaivour of central and sub-central tiers of government during general government consolidation attempts. There is a well established literature examining fiscal consolidations however, it has exclusively focussed upon general (i.e. total) or central government fiscal policies[2]. In addition, by examining sub-central involvement in general government consolidation attempts and their behaviour during episodes when they consolidate themselves, we contribute to the decentralisation literature by assessing the role of the sub-centre in the conduct of national fiscal policy. As discussed in Chapter 1, this literature has been largely normative in nature and empirical examinations of the role of sub-central governments in shaping national policy and in the macroeconomy are in general relatively limited.

[1] We are grateful to participants at the European Economic Association 2004 Conference, the Scottish Economic Society 2004 Conference, Department of Economics Staff Seminars at the Universities of Glasgow and Strathclyde and at the Scottish Graduate Programme's 2003 Conference for very useful comments on earlier versions of this Chapter.

[2] See for example, Alesina and Perotti (1995 and 1997), Alesina *et al.* (1998), McDermott and Wescott (1996) and Von Hagen *et al.* (2001).

As mentioned in the Introductory chapter, governments' attempts to improve the sustainability of their fiscal balances have been at the forefront of fiscal policy discussion for more than a decade. In some countries the consolidation effort has resulted in sizeable surpluses for the first time in a generation. Debt to GDP ratios have been stabilised and begun to fall. Elsewhere, some previous bastions of fiscal prudence are now struggling to maintain or regain sound fiscal positions. Lower interest rates have reduced debt servicing costs for the majority, but adherence to fiscal rules and the fiscal implications of ageing populations will ensure that the need to strengthen fiscal positions will remain a key issue in the years to come.

The established literature has concluded that the composition of the consolidation effort is a crucial determinant of the ultimate effect on debt. Throughout this literature (see for example, Alesina and Perotti (1995) Alesina *et al.* (1998), McDermott and Wescott (1996) and Von Hagen *et al.* (2001)) the focus has been on general government data. This has one clear advantage in that large and consistent datasets such as the OECD Economic Outlook and the IMF Financial Statistics, are readily available. However, in our view, this advantage is outweighed by a key weakness. This approach implicitly assumes that governments behave as if a single authority exercises complete control over the size and composition of fiscal balances. Indeed, political economy models of fiscal consolidations, including Alesina and Drazen (1991), Roubini and Sachs (1989), assume a single tier of government. In view of the substantial role played by sub-central governments in the conduct of fiscal policy outlined in Chapter 1, we believe there is value in extending this literature to look at the distinct contributions made by sub-central and central government and examine how these tiers of government interact during consolidation attempts.

To anticipate our key results, we begin by verifying a result from the existing literature that successful consolidations tend to be based upon expenditure cuts as opposed to increases in revenue. We show however, that this result is robust to a more refined measure of the success of consolidation attempts, and holds at both central *and* sub-central tiers; indeed the majority of consolidations involve shared effort across tiers of government.

Compositional analysis confirms another existing result; that tackling the government wage bill helps achieve lasting consolidation. We demonstrate that the involvement of sub-central tiers of government is crucial to achieving cuts in the wage bill. However, our results also demonstrate that a consolidation attempt is less likely to be successful if the relative brunt of the consolidation is skewed toward the sub-central tier. Our analysis of revenue by source reveals that many central governments exert a strong influence on the expenditure of sub-central tiers through their grant allocations. Changes in these allocations essentially 'force the hand' of the sub-central tiers to adjust expenditures and consequently have a considerable impact upon the successfulness of consolidation attempts. An apparent downside is revealed in the analysis of the composition of expenditure in that there is a bias toward cuts in local/regional public investment programs (although the largest adjustment in absolute terms centres upon the wage bill).

In addition to examining consolidations instigated by central governments we also look at those instigated by the sub-central tier. This enables us to ask if the sub-central tier behave differently when consolidating alone. Interestingly, when shifting

focus to sub-central consolidation attempts we find a parallel result to the general government consolidation case, in that consolidations which focus upon expenditure cuts, are more likely to lead to healthier sub-central balances than those based upon revenue increases. Finally, when sub-central governments enact consolidation attempts that are not part of a general government consolidation, their cuts focus almost exclusively upon capital expenditure, as opposed to increases in 'own-source' revenues or cuts in current expenditure. The bias toward cuts in capital expenditure represents a genuine cause for concern, as they are likely to have long-term implications for local service provision.

We discuss all these results in more detail below. Overall they lead us to conclude that the separate roles of central and sub-central tiers of government should not be ignored when analysing fiscal consolidations. The structure of the remainder of this chapter is as follows. In Section 3.2 we undertake a brief review of the fiscal consolidation literature and compare and contrast our analysis with previous studies. Section 3.3 presents a discussion of identified episodes of general government fiscal consolidation focussing on their size, the composition of the consolidations and the extent to which the attempts are co-ordinated across tiers of government. In Section 3.4 we switch the focus from general government consolidations to sub-central consolidations and examine their composition. Section 3.5 concludes.

3.2. Fiscal Consolidations – Literature Review

3.2.1 Brief Overview of Fiscal Consolidations

As one may expect, given the relative prominence of fiscal consolidation effort in recent years, a substantial academic literature has been developed. This literature can be loosely divided into two strands. The first branch of papers study the macroeconomic consequences of consolidation attempts while the second, focuses on their relative success. We discuss each of these in turn.

Traditional textbook Keynesian models such as the IS/LM predict that fiscal tightening, by reducing aggregate demand, generates a fall in consumption, investment and output. Thus, following a consolidation attempt, one should expect to observe recessionary pressures in the economy[3]. However, this conclusion has been increasingly challenged in the literature. Giavazzi and Pagano (1990) and Bartolini *et al.* (1995) demonstrate that following well-documented consolidation attempts in Ireland (1987 – 89) and Denmark (1983 – 86) output actually accelerated[4]. The apparent evidence of 'non-Keynesian' effects has sparked a whole host of empirical and theoretical studies. Recent empirical re-examinations of consolidations and the impact on the macroeconomy include Perotti (1999), Giavazzi *et al.* (2000) and Alesina *et al.* (2002). Perotti (1999) find empirical evidence which suggests that

[3] In these models the effects are weakened somewhat through the associated declines in interest and exchange rates that cushion the fall in domestic demand by raising private wealth and stimulating net exports by depreciating the domestic currency.

[4] Note there is also evidence of decelerations in growth following fiscal expansions. For example, Sweden in the early 1990s, see Giavazzi and Pagano (1995).

private consumption increases in response to cuts in government spending, provided the debt to GDP ratio is growing rapidly. Giavazzi *et al.* (2000) on the other hand focus upon national saving and find analogous results[5], while Alesina *et al.* (2002) find non-Keynesian effects in investment equations. In addition, the European Commission undertook a more general study in 2003 of post-consolidation economic performance. This found that in around half of all consolidations undertaken by EU countries, average real GDP growth rate was higher in the two years after consolidation than in the two years preceding it.

Of more direct relevance to this chapter, the second major branch of the literature has focussed on the ability of consolidation attempts to generate long-term improvements in a country's fiscal position. In two complementary studies, Alesina and Perotti (1995) and McDermott and Wescott (1996) found that while following certain consolidation attempts there were substantial and sustained improvements in a country's fiscal position. In others, improvements were either far more modest or indeed, failed to materialise. The case of the Irish consolidations in the 1980s is again often cited as an example. Following previous attempts at consolidation in the early 1980s, the Irish debt to GDP ratio continued to increase. However following the second round of adjustment later on in the decade, the debt to GDP ratio stabilised and ultimately began to fall.[6].

[5] A more recent study by Miller and Russek (2003) also finds limited evidence of non-Keynesian effects during unusual times.

[6] Prior to this second consolidation attempt the Irish debt to GDP ratio was well in excess of 100% of GDP. Since then, the ratio has fallen dramatically and now stands at around 60% of GDP – see Bradley and Whelen (1997) and Dornbusch (1989).

While our primary focus is upon the second strand both are not mutually exclusive. As we will see in the next section, one of the main reasons certain consolidations are better placed to bring about falls in the debt to GDP ratio, is precisely because they are able to generate improvements in output (or at least limit any recessionary effects).

3.2.2 Determinants of Successful Consolidation Attempts

To date, the literature has established that the composition of a consolidation attempt in terms of its relative focus upon expenditures or revenues, is key to determining whether or not a consolidation attempt will bring about medium to long-term improvements in a country's fiscal position. While the size of the consolidation is also important, i.e. the extent of the overall adjustment in the fiscal balance, it is thought to be of lesser significance. This result has been widely reported and can be found in Alesina and Perotti (1995 and 1997), Alesina *et al.* (1998), Alesina and Ardagna (1998), OECD (1996), Perotti (1996), Heylen and Everaert (2000), Von Hagen *et al.* (2001), EC (2003) etc. However, Ardagna (2004), finds that it is the size rather than the composition that is key to success.

Consolidation attempts that are primarily based upon cuts to current expenditures, in particular social transfers and the government wage bill, have been shown to be far more likely to be successful than consolidation attempts which, rely upon revenue increases and cuts in public investment. For example, Alesina and Perotti (1995 and 1997) demonstrate that while the size of the fiscal improvement

tends to be similar across their identified consolidation attempts, in those where there is a substantial medium to long-term improvement in the debt ratio, expenditures were cut by a far greater extent than revenues were increased. The exact opposite occurred during consolidation attempts which brought about no such improvements.

There are a number of channels of transmission which can explain why the composition of consolidation is important. Below we discuss three, however these are not mutually exclusive and they do not exhaust all possible channels through which fiscal stabilisations can be successful.

A first argument is based on the concept that different types of fiscal consolidation may be inherently more or less permanent. Tackling elements of current expenditure such as the government wage bill and social transfers, are thought to be more durable than increasing taxation or limiting investment programs (e.g. limiting depreciation repayments), given the transaction costs both administratively and politically in altering them. For example, a consolidation based upon reform of benefit eligibility criteria for welfare payments is likely to require substantial consultation, possible revision and repeated readings in Parliament before it is passed as legislation. Thus, such a reform is likely to be relatively long term. However, adjusting tax rates or profit transfers from state-owned enterprises, postponing investment replacement etc, all have far fewer constraints on the ability to alter them in the near future. There is therefore a higher probability that such expenditures and revenues will return to previous levels[7]. Moreover, Alesina and Perotti (1997) argue that items such as the

[7] Maroto and Mulas-Granados (2001) found that the duration of fiscal consolidations in the EU during the last forty years has been influenced by among other things the extent of expenditure cuts with 'longer' consolidations associated with larger cuts in expenditure.

government wage bill and social welfare payments are the most likely elements of fiscal policy to increase outside periods of adjustment. Thus by focussing on these elements, any trend increase in government size and/or deficit can be curbed.

The second argument relates to the extent that certain consolidation attempts may be better placed to generate non-Keynesian effects in output than others. An improving macroeconomic environment can serve to reduce interest repayments and social transfers while increasing taxation revenues, complementing the direct attempts to strengthen the fiscal position.

A number of explanations for the potential existence of a negative fiscal multiplier following consolidation attempts (i.e. contractions lead to accelerate growth) have been suggested – see for example, Blanchard (1990), Bertola and Drazen (1993), Barry and Devereux (1995), Sutherland (1997) and Perotti (1999).

The 'expectation view', stems from an idea put forward by Feldstein (1982) who hypothesised that permanent public expenditure reductions may be expansionist if they are seen "as an indication of future tax cuts, giving rise to expectations of a permanent income increase". Note however, that it may not need to be expectations of future tax cuts, but that a substantial fiscal tightening now, "eliminates the need for larger, maybe much more disruptive adjustments in the future" – Blanchard (1990). If for example, taxes are distortionary so that tax increases imply a deadweight loss, adjusting sooner rather than later reduces such costs and the permanent distortions of the fiscal consolidation. In addition, by reducing future tax liabilities private sector wealth increases. Both the permanent income and wealth effects can boost private

consumption, aggregate demand and ultimately output. Moreover, by resolving uncertainty over the course of future fiscal policy, a credible consolidation may reduce precautionary saving. That expectation and private sector wealth effects in certain instances, may be sufficiently large to counteract the traditional demand side Keynesian effects of a consolidation attempt, has received qualified support in the literature. Bhattacharaya (1999) presents evidence that households move from non-Ricardian to Ricardian behaviour at higher debt to GDP levels. Sutherland (1997) and Perotti (1999) argue theoretically that these expectation and wealth effects will be larger when there is a significant public debt to GDP ratio or budget deficit. This hypothesis is supported by empirical evidence provided in Alesina and Ardagna (1998). They argue it is therefore possible to observe non-linearities such as Keynesian effects in normal times and non-Keynesian effects in unusual times[8].

Clearly, expectation effects are likely to be more significant in response to larger than smaller consolidation attempts. In addition, Alesina *et al.* (1998) argue that by focussing on politically sensitive elements of fiscal policy, consolidation attempts that are based upon components of current expenditure rather than revenues or capital expenditure can lead to greater positive expectation effects. For example, cutting expenditure on welfare and wages can send a signal to the private sector that the government is serious about the adjustment being undertaken. Such elements are likely to be politically, the toughest cuts for a government to make. If a cut in current expenditure is viewed as being permanent by the private sector because it focuses on 'sensitive' elements, the potential for wealth effects being sufficiently large to

[8] In contrast, the model of Bertola and Drazen (1993) predicts non-Keynesian effects in normal times and Keynesian effects in unusual times.

generate non-Keynesian effects is increased. Giavazzi and Pagano (1996) and Ardagna (2004) show that strong and persistent cuts to government expenditure rather than tax increases, are more likely to stimulate short-term economic growth.

The above channel through which substantial fiscal retrenchment, can contrary to established theory boost output, stresses the importance of demand side effects. In addition however, it is possible that similar non-Keynesian effects can be generated from the supply side. More specifically, it is possible that certain types of fiscal consolidation may distort the labour market, leading to lower unit labour costs[9]. This approach is often called the 'labour market view'. A large purge of the government wage bill, government employment and social transfers, can reduce wage demands by limiting the bargaining power of unions. Following lower unit labour costs, profitability and international competitiveness can be increased[10]. Union power is limited because lower levels of public employment and/or wages, reduces the reservation utility of union's members and the cuts to social transfers increases the cost of being unemployed. In contrast, increases in taxation shift the aggregate supply of labour, reducing after-tax real wages and inducing unions to demand higher nominal wages. The increase in real wages leads to a reduction in the equilibrium level of employment and of the shadow value of capital, with negative effects on capital accumulation and on growth. It follows therefore, that consolidation attempts based upon cuts to the government wage bill and social transfers, instead of increases in taxation, can generate positive supply side effects including the stimulation of

[9] For a discussion of how composition can lead to expansionary fiscal consolidations via the labour market channel see Alesina and Perotti (1997) and Daveri and Tabellini (2000).

[10] Clearly such effects are dependent upon institutional factors and the existence of non-perfectly competitive labour markets to be of significance. In addition, any benefits in terms of competitiveness will be more keenly felt in more-open economies.

investment, net exports and ultimately output. Furthermore, cuts to government wages as opposed to increases in labour taxation, will loosen rather than tighten the labour market. This increases the responsiveness of labour to improvements in competitiveness and demand brought on by the potential positive private sector demand effects discussed above.

Alesina and Ardagna (1998) and Ardagna (2004) examine the significance on economic growth of both the effect of expectations and the labour market following consolidation attempts. They find that while the labour market effect is nearly always significant, the expectation effect is only significant in certain estimation specifications. They conclude that their results provide cautious support to the supply-side view of non-Keynesian effects, without denying a more limited role for the demand-side channel. Giavazzi and Pagano (1996) and Giavazzi *et al.* (2000) find non-Keynesian effects are more likely to occur when the size of the consolidation is large.

A third possible explanation for certain consolidations being more successful than others, relates to the impact on a government's borrowing requirement. High debt countries face 'premiums' on the interest rate that they can borrow (i.e. issue bonds) given the potential for default and inflation. A credible fiscal consolidation (perhaps based on cuts to 'sensitive' expenditure programs) can serve to reduce country's interest risk premiums. One major reason why countries fall into fiscal difficulties is through the 'debt trap', whereby ever higher primary surpluses are necessary simply to finance interest payment on outstanding debt. Clearly by reducing such payments, the ability to stabilise or even reduce the debt ratio is improved. In

addition, to the extent that in general lower premiums on government bonds also lead to lower real interest rates, this can lead to a crowding-in of investment, expansion in consumption and growth in output. Further, as pointed out by McDermott and Wescott (1996), falling real interest rates can increase the market value of asset portfolios held by consumers, triggering a consumption/investment boom.

All three possible avenues suggest that consolidation attempts that are based upon adjustments to key elements of expenditure such as social transfers, government wages and so forth are more likely to be long-term, generate non-Keynesian effects and so forth than those based upon revenue increases.

In summary, the composition and size of a consolidation attempt can be key to determining whether or not there are long-term improvements in the fiscal position of a country. Consolidations based on cuts to current expenditure such as social transfers and wages, by focussing on the most administratively and politically costly elements of the budget and those most likely to increase outside periods of adjustment, are more likely to lead to permanent improvements than those based on revenue hikes or cuts in investment programs. In addition, these same consolidation attempts appear best able to generate non-Keynesian effects in consumption, investment, output etc, which in turn can greatly assist long-term financial stability.

In all these studies, the role of sub-central governments during the consolidation process is ignored. For example, in the descriptive analysis of Alesina and Perotti (1995 and 1997), McDermott and Wescott (1996) and Alesina *et al.* (1998), the size and composition of adjustment is analysed at the general government

level. It is not possible to make comment on the individual contributions of the centre and the sub-centre. Are national consolidation attempts instigated entirely by the centre? Do sub-central tiers assist or hinder such attempts? What is the size of the contribution of the sub-centre, especially in key areas of expenditure and revenue to the consolidation effort? How do sub-central governments themselves consolidate? These are all highly relevant questions which as yet have been unanswered. We seek to address these issues and more in this Chapter by conducting a descriptive analysis of fiscal consolidation attempts similar to previous studies but on this occasion separating out the unique contributions of the centre and sub-centre.

3.3 Analysing General Government Consolidation Effort Across Tiers of Government

We begin our empirical analysis with a discussion of general government consolidation attempts. In order to identify such consolidation attempts we apply the methodology outlined in Chapter 2. In the main body of the text we present and discuss our results based upon the application of the BFI to measure discretionary fiscal impulses, Definition 1 to identify consolidation attempts and Definitions 2 and 3 to measure their relative success. See Table 2.4 in Chapter 2[11].

We start by looking at the discretionary impulses attributable to each tier of government during a general government consolidation attempt and show that sub-

[11] As a check on the robustness of our results we have re-conducted our analysis using a variety of different methodologies. A sample of our results is provided in an Appendix.

central tiers of government do play important roles in the consolidation process, contemporaneously with the central tier[12]. We then look in more detail at the composition of the consolidation effort, first by separating out the changes in expenditure and revenue and then by breaking down these aggregates into their key components.

3.3.1 Analysis of Discretionary Fiscal Impulses by Tier of Government

Table 3.1 shows the average sizes of the discretionary fiscal impulse as a proportion of GDP, across all the identified consolidation attempts (refer back to Table 2.4 in Chapter 2 for details), across successful and failed attempts (denoted "S" and "F") respectively, and disaggregated by tier of government. The final column of the table indicates whether the difference between average impulses in successful as opposed to failed consolidation attempts is statistically significant on the basis of a two sample t-test[13].

[12] We have examined whether central government adjustments lead sub-central ones. However, the sub-centre's contemporaneous fiscal impulse is almost uniformly greater than that in T+1 suggesting that sub-centre adjustment occurs in the same period as the centre. For a more comprehensive analysis of the timing and duration of various changes see Chapter 4.

[13] The null hypothesis in each case is that the size of the impulse is identical in successful and failed consolidation attempts. A single '*' in the "signif:" column denotes significance at the 10% level, while '**' and '*' denote significance at the 5% and 1% levels respectively.

Table 3.1: Discretionary Fiscal Impulses During General Government Consolidation Attempts (each shown as % of GDP)				
All/Successful/Failed	All, n=61	S, n=22	F, n=39	signif:
Central	2.08	2.47	1.86	*
Sub-Central	0.40	0.43	0.38	
Success Index (SI):	SI=3, n=22	SI=2, n=12	SI=1, n=17	SI=0, n=10
Central	2.47	2.22	1.82	1.51
Sub-Central	0.43	0.23	0.31	0.68

The above results confirm that the average discretionary impulse at general government level, where general = central + sub-central, is larger in successful as opposed to failed consolidation attempts (as found by Alesina and Perotti (1995), Alesina *et al.* (1998) and Von Hagen *et al.* (2001)). The size of the central government fiscal impulse is larger in successful as opposed to failed consolidation attempts and this difference is statistically significant at the 10% level. In addition, the lower panel of the table reveals that the size of the central impulse is increasing in the degree of success (as measured by the success index). Sub-central impulses are also larger on average during successful as opposed to failed consolidation attempts but this difference is not statistically significant.

The results based on the success index are more revealing: in the most successful consolidation attempts there are relatively large sub-central impulses but the average impulse is largest overall for the failed category, SI=0. It is interesting to note that in the more successful adjustments (SI=3,2,1) the sub-central tier achieves around 10-15% of the total impulse on average, while in the least successful case the sub-central tier's contribution exceeds 30% and the overall general impulse is

relatively small. We can interpret these results as demonstrating that the dominant adjustment in general government consolidation attempts is made by the central tier, though sub-central tiers of government are also generally actively involved. If however, the consolidation effort is skewed toward the sub-central tier, we observe that the attempt is less likely to be successful.

3.3.2 Analysis of the Composition of Consolidation Attempts

As discussed above, the existing literature has concluded that a consolidation attempt is most likely to succeed if it is focussed on cuts in expenditure, and in particular, on cuts in the government wage bill and transfer payments. In contrast consolidations based upon tax hikes and cuts in public sector investment seem more likely to represent short-lived effort and to end in failure.

In Table 3.2 we present results, for the first time, of a compositional analysis of consolidation attempts using data disaggregated by tier of government as well as by function.

Table 3.2: Expenditure and Revenue Changes During General Government Consolidation Attempts
(each shown as % of GDP)

	Total Expenditure				Total Revenue			
	All, n=61	S, n=22	F, n=39	signif	All, n=61	S, n=22	F, n=39	signif
Central	-0.56	-1.19	-0.21	***	0.76	0.51	0.89	
Sub-Central	-0.24	-0.56	-0.07	***	0.14	0.08	0.17	
Success Index:	SI=3, n=22	SI=2, n=12	SI=1, n=17	SI=0, n=10	SI=3, n=22	SI=2, n=12	SI=1, n=17	SI=0, n=10
Central	-1.19	-0.46	-0.12	0.16	0.51	0.87	0.69	1.27
Sub-Central	-0.56	-0.32	-0.06	0.21	0.08	-0.17	0.34	0.29

Table 3.2 reports average changes in total expenditure and revenue achieved during successful and failed consolidation attempts respectively[14].

We again begin by confirming the findings in the literature based on general government data (e.g. Alesina and Perotti (1995) and Von Hagen *et al.* (2001)) in that successful consolidation attempts are associated with large general government expenditure cuts, in excess of 1.7% of GDP on average. In contrast, failed attempts are associated with significantly smaller cuts in expenditure and somewhat larger revenue hikes (though note that the difference in revenue hikes across successful and failed attempts is not statistically significant).

[14] Total expenditure is defined as primary expenditure less transfers (grants) paid from one tier of government to another. The focus on primary spending ensures that interest payments on outstanding debt are excluded from the analysis, since governments have little discretion over these in the short term. Transfers from the central tier of government to sub-central tiers will be recorded when they are spent at the sub-central level, so to include this as an element of central government spending would result in double counting. Total Revenue includes tax revenue, non-tax revenues (from fees and user charges) but excludes grants received from other levels of national government (though grants received from outside government, e.g. the EU, are included).

A new result revealed in Table 3.2 is that successful consolidation attempts are associated with substantial expenditure cuts by both the central and sub-central tiers of government. In failed consolidation attempts the expenditure cuts achieved across all tiers of government are significantly smaller, and the lower portion of the table reveals that in the least successful category, SI=0, expenditure of both tiers actually rises. The lower panel of Table 3.2 shows that the largest increases in revenue are recorded for both tiers when SI=0 i.e. in the least successful consolidation attempts. The average increase in revenues collected by the central tier when SI=0 is more than twice that achieved in the most successful consolidation attempts, i.e. when SI=3, while for sub-central tiers the adjustment to revenues is more than three times larger. Overall, these results offer clear support to the hypothesis that the composition of a consolidation attempt is critical to its probability of success. At each tier of government, the average cuts in expenditure associated with consolidation attempts fall in size as we reduce the stringency of the requirement for success; the reverse pattern is observed across revenue changes, whereby the greater success accords with less reliance on increases in revenue, and less reliance on adjustment at the sub-central level.

The above analysis has shown that all tiers of government, central and sub-central, are actively engaged in most consolidation attempts. However, it does not allow us to disentangle which level of government takes the relative brunt of the expenditure or revenue adjustment. To examine this question, we have calculated the percentage share of general government expenditure and revenues conducted or received by the respective tiers both prior to and following each consolidation attempt. Overall, the average shares of general government expenditures conducted at

the sub-central tier alter little during consolidation attempts but if we differentiate between successful and failed attempts, the share of general government expenditure assigned to sub-central authorities is 19% higher on average after a successful attempt and some 5% lower after failed attempts. Again, this suggests that bias of expenditure cuts toward the sub-central tier is not conducive to success. The sub-central share of general revenues falls by some 18% on average during a consolidation attempt but this decline is more pronounced in successful (22%) as opposed to failed attempts.

3.3.3 The Composition of Expenditure and Revenue Changes During Consolidation Attempts

We extend our analysis by splitting up the expenditure aggregates into their key components: current expenditure (less interest payments) and capital expenditure[15].

[15] As before, payments made by central to sub-central tiers of government are stripped-out of current and capital expenditure.

Table 3.3: Changes in Expenditure Components During General Government Consolidations
(each shown as % of GDP)

	Current Expenditure				Capital Expenditure			
	All	S	F	signif	All	S	F	signif
Central	-0.40	-1.18	-0.04	***	-0.16	-0.14	-0.16	
Sub-Central	-0.15	-0.49	-0.03	**	-0.10	-0.16	-0.07	*
Success Index:	(3)	(2)	(1)	(0)	(3)	(2)	(1)	(0)
Central	-1.18	-0.24	-0.07	0.35	-0.14	-0.24	-0.10	-0.18
Sub-Central	-0.49	-0.37	0.09	0.26	-0.16	-0.15	0.09	0.01

Once again there is a clear correlation between the size of cuts in current expenditure and success. On average, the cuts are significantly larger during successful consolidation attempts, and across all tiers of government. Furthermore, the larger the cuts in current expenditure achieved the greater the success of the consolidation attempt, and again this result holds at each tier of government.

Alesina and Perotti (1995, 1997) identified cut-backs in capital expenditures as a sign of an unsuccessful fiscal consolidation. In contrast, we find that at the central government level there is no significant difference in the size of the cuts observed according to our measures of success. The pervasive nature of these cuts across all consolidations suggests that cuts in central government capital expenditure do not contribute to the success of a consolidation attempt.

The absolute size of the cuts in capital expenditure as a proportion of GDP are small relative to the cuts in current expenditure, but it is important to note that the value of current expenditure is roughly ten times larger than capital expenditure for the countries in our sample, therefore the proportionate cuts in capital spending are

actually relatively severe. This is especially important when interpreting the figures for the sub-central tier, where around 40% of the overall contraction in expenditure is borne by regional and local public investment programs and where significantly larger cuts in capital spending occur during more successful consolidation attempts, as shown in the final row in Table 3.3. This reveals a clear downside of the consolidation process. Such cuts, where sustained can be expected to have a significant adverse consequences for local service provision in the long run.

Table 3.4 presents a disaggregation of current expenditure into the government wage bill, transfers and subsidies, and purchases of goods and services. Across all three categories of expenditure larger expenditure cuts are associated with successful as opposed to failed consolidation attempts. The results also highlight the statistically significant role of cuts made at the sub-central level in each case.

Table 3.4: Changes in Components of Current Expenditure During General Government Consolidations
(each shown as % of GDP)

	Goods and Services[16]				Social Transfers & Subsidies[17]				Wage Bill			
	All	S	F	Sig	All	S	F	Sig	All	S	F	Sig
Central	-0.06	-0.16	-0.01	**	-0.21	-0.76	0.10	***	-0.14	-0.19	-0.12	
Sub-Central	0.00	-0.09	0.05	**	-0.06	-0.15	0.00	**	-0.12	-0.22	-0.07	**
Success Indx:	(3)	(2)	(1)	(0)	(3)	(2)	(1)	(0)	(3)	(2)	(1)	(0)
Central	-0.16	-0.02	-0.03	0.04	-0.76	0.02	0.05	0.25	-0.19	-0.24	-0.09	0.00
Sub-Central	-0.09	0.00	0.05	0.12	-0.15	-0.15	0.09	0.01	-0.22	-0.22	-0.05	0.10

Cuts in social transfers and subsidies are particularly large and not surprisingly skewed toward central government which plays the dominant role in these categories of expenditure – see Table 1.1 in Chapter 1. Evidently, a large and distinct tightening of welfare programs by the central tier increases the likelihood that a given consolidation will be successful. The role of the sub-central tier is more important in the remaining elements of current expenditure: during successful consolidations around one third of the total cuts in the purchases of goods and services and more than half the cut in the government wage bill stem from cuts made by the sub-central tiers of government. In fact, the significant element of cuts in the government wage bill relate solely to the sub-central tier, where the wage bill is cut by significantly larger amounts during successful as opposed to failed consolidation attempts.

[16] Lack of appropriate disaggregated data leads us to exclude Australia from these tables.
[17] Transfers and subsidies for Irish sub-central data includes inter-government transfers from the centre.

These are important results. Whilst previous studies have stressed the importance of reducing the government wage bill as a key determinant of success, the prominent role of the sub-central tier of government in this process has not previously been identified. A clear implication of this result is that central governments wishing to enact a successful fiscal consolidation should consider coordinating with the sub-central tier and in particular should emphasise the importance of reducing their wage bill in this process. One way in which this may be conducted in practice is via some form of centralised element to public sector pay settlements, although adjustment to public sector employment and hours of work will also be important.

In Tables 3.5 and 3.6 we switch our focus to decomposing changes in revenue during consolidation attempts. Recall that the aggregate figures in Table 3.2 suggested that failed consolidation attempts have tended to be associated with a greater increase in non-grant revenues at both the central and sub-central tiers as compared with successful consolidation attempts, although this difference was not statistically significant. In disaggregating total revenue into its components we are able to refine this result and pin down some significant differences between successful and failed consolidation attempts.

Table 3.5: Composition of Changes in Revenue During Consolidation Attempts
(each shown as % of GDP)

	Tax Revenues				Non-Tax Revenues				Grants[18]			
	All	S	F	Sig	All	S	F	Sig	All	S	F	Sig
Central	0.70	0.60	0.73		0.02	-0.13	0.10	*	0.02	0.00	0.03	
Sub-Central	0.10	0.14	0.08		0.00	-0.08	0.06	**	-0.16	-0.47	0.02	***
Success Index:	(3)	(2)	(1)	(0)	(3)	(2)	(1)	(0)	(3)	(2)	(1)	(0)
Central	0.60	0.84	0.52	1.03	-0.13	-0.09	0.09	0.36	0.00	0.09	0.00	-0.02
Sub-Central	0.14	-0.28	0.28	0.21	-0.08	0.04	0.06	0.10	-0.47	0.02	-0.02	0.09

In Table 3.5 we disaggregate revenues by source: taxes, non-tax revenues (essentially user charges and fees), and grants. Table 3.6 splits tax revenues accruing to the sub-central tiers into 'shared' taxes, that are controlled and distributed by the central tier, and 'own-source' tax revenues over which the sub-central tiers have a degree of autonomy.

As discussed in Chapter 1, GFS does not distinguish between shared and own tax revenues and our data is based on calculations from OECD (1999) and from Rodden (2003). There are, however, two caveats with this dataset. The first is that it results in the loss of observations for two countries (France and Australia). The second is that the reference date for these measures of tax autonomy (see Table 3.7) is fixed at 1995 levels. Sub-central taxes are identified as 'own-source' if the sub-central

[18] For two of our observations, Spain 1985 and 1986, constitutional reform resulted in the assignment of certain expenditures to sub-central tiers to be financed by grants. Thus our data points are likely to be influenced by such changes. Upon elimination of these two observations, the average change in grants during unsuccessful consolidations stands at –0.05 and the difference between successful and unsuccessful consolidations remains significant.

authorities have the ability to control the tax rate, or the tax base, or both. To measure the extent of changes in sub-central revenue that we can identify as 'own-source' we multiply the change in sub-central taxation by the percentage of total sub-central tax revenues defined as 'own-source'. This clearly is a simplification and the actual changes in sub-central taxation may not be apportioned in this way, however, without more accurate information for each individual consolidation attempt it is the best approximation that one can make.

As we would expect, the figures in Table 3.5 confirm that the largest source of increased revenues during consolidations stems from taxation and is mostly driven by changes at the central tier. Results relating to our success index support the view that outright failed consolidations, where SI=0, rely to a far greater extent upon tax hikes (as opposed to cuts in expenditure) than do successful ones.

Table 3.6: Autonomous Sub-Central Changes in Tax Revenue During Consolidation Attempts
(each shown as % of GDP)

	'Shared' Tax Revenues				'Own-source' Tax Revenues			
	All	S	F	Sig	All	S	F	Sig
Sub-Central	0.02	0.06	0.00		0.08	0.08	0.08	
Success Index:	(3)	(2)	(1)	(0)	(3)	(2)	(1)	(0)
Sub-Central	0.06	-0.05	0.06	0.11	0.08	-0.22	0.26	0.18

Table 3.6 demonstrates that autonomous or 'own-source' changes in sub-central taxation contribute a sizeable proportion of overall tax adjustment during consolidation attempts. The two least successful consolidations (SI=1,0) typically involve the largest increases in sub-central governments' 'own-source' taxation.

Conclusive results are uncovered in Table 3.5 in relation to non-tax revenues. When either tier of government tries to raise additional revenues from these sources the consolidation is likely to fail. Indeed, successful consolidation attempts appear to be associated with a decline, rather than a rise, in non-tax revenues. The difference is statistically significant in each case.

The behaviour of grants from other tiers of government, again highlighted in Table 3.8, are also of clear interest. In successful consolidation attempts, grants to sub-central tiers of government are cut substantially while in failed consolidation attempts grants appear to alter very little. The difference between the average changes is statistically significant at the 1% level. These results appear to show that central governments have been more successful in consolidation attempts when they have 'forced the hands' of the sub-central tiers through reducing their grant allocations. Grant allocations tend to be highly visible and politically sensitive, so it seems reasonable to deduce that cuts in grants can have a strong signalling effect, thereby indicating that the central government is serious about addressing the fiscal position. In many cases the sub-central tier have little autonomy to raise other sources of revenue, or to borrow, therefore cuts imposed directly constrain the expenditure of sub-central authorities. The close correlation between cuts in grants and cuts in expenditure is essentially the reverse of the 'flypaper' effect documented by Gramlich (1977) and others[19]. Again, we note that a downside of this relationship is the substantial cut in public investment discussed above in relation to Table 3. Together these results suggests that it may be desirable for central governments to consider

[19] The 'flypaper' effect refers to the empirical phenomenon that increases in lump-sum transfers to sub-central tiers stimulates increases in local spending to a far greater extent than increases in local income.

offering greater protection to regional and local public investment programs when following a strategy of cutting grant allocations.

3.4. Consolidation Attempts Implemented by Sub-Central Tiers of Government

Our analysis thus far has focussed on consolidation attempts identified in general government data, the majority of which we would expect have been instigated at the central government level. In this section we turn our attention to consolidations solely identified in sub-central government data. Here we explore the timing and composition of the adjustments undertaken by sub-central tiers of government and contrast these results with their behaviour during general government consolidation attempts. We are unaware of any previous studies into the mechanics of sub-central consolidations. A key question is whether the sub-central tiers behave differently when consolidating alone as opposed to when they adjust in conjunction with the centre.

We begin by looking at all 47 sub-central consolidations identified (Definition 4, Chapter 2) and the 20 of these attempts deemed to have been successful (Definition 5). In terms of the size of sub-central consolidation attempts the mean impulse is 0.95% of GDP[20]. Estimates of average fiscal impulses during successful and unsuccessful consolidation attempts are virtually identical. Table 3.7 examines the composition of sub-central consolidations.

[20] There is a large outlier with an adjustment in Canada of over 3% of GDP.

Table 3.7: Expenditure and Revenue Changes During Sub-Central Government Consolidation Attempts
(each shown as % of GDP)

	Total Expenditure				Total Revenue			
	All, n=47	S, n=17	F, n=30	Signif	All, n=47	S, n=17	F, n=30	Signif
Sub-Central	-0.18	-0.41	-0.04	*	0.21	0.03	0.33	**

Sub-central consolidations typically involve cuts in expenditure and increases in revenue. Interestingly, we discover a similar pattern to our analysis of general government consolidations in that successful sub-central consolidations typically involve significantly larger cuts in expenditure and smaller increases in revenues than unsuccessful ones.

Table 3.8 decomposes the changes in expenditure and revenue into their various components.

Table 3.8: Composition of Adjustments During Sub-Central Consolidation Attempts[21]

(each shown as % of GDP)

Expenditure														
Current Expenditure			of which: Goods and Services			Wage Bill			Transfers and subsidies			Capital Expenditure		
All			All			All			All			All		
0.00 (0.73)			-0.01 (0.27)			-0.03 (0.36)			0.02 (0.32)			-0.15 (0.26)		
S	F	Sig	S	F	Sig	S	F	Sig	S	F	Sig	S	F	Sig
-0.18	0.10	*	-0.08	0.03		-0.11	0.02		-0.01	0.04		-0.16	-0.15	

Revenue												
Taxation, of which:						Non-Tax Revenues			Grants			
Total			Own-Taxes									
All			All			All			All			
0.25 (0.57)			0.21 (0.50)			0.04 (0.18)			0.29 (0.62)			
S	F	Sig	S	F	Sig	S	F	Sig	S	F	Sig	
0.06	0.20	*	0.04	0.18		-0.02	0.10	*	0.10	0.18		

While both current and capital expenditures are cut during sub-central consolidations, it is the latter which takes the brunt of the adjustment. Cuts to the wage bill and current expenditure during sub-central consolidations are on average smaller in relative terms than the corresponding cuts during general consolidations – see Table 3.4. During general government consolidations, we have shown that sub-central cuts in current expenditure and the wage bill amounted to a substantial proportion of the overall cuts in expenditure. In fact, on average current expenditures

[21] Standard deviations are given in brackets.

were cut by over 2 ½ times more than capital expenditures. Here however, capital expenditure cuts appear to be the main instrument of adjustment. During unsuccessful consolidations, current expenditures actually increase. In contrast, during successful consolidations, current and capital expenditures are cut by roughly equal amounts.

Interestingly, the largest increases in revenue originate from 'own-source' taxation and grants. Such increases appear to compensate for the rise in current expenditures during unsuccessful attempts.

We again find evidence of an apparent distinction between successful and unsuccessful consolidations. Table 3.8 shows that successful consolidations at the sub-central tier typically involve larger cuts in the individual components of expenditure than occurs during unsuccessful ones. In contrast, taxation (both total and own-source) and non-tax revenues rise to a greater relative extent in unsuccessful consolidations. Thus, we can conclude that the composition of consolidation attempts appears to be important at both the general and sub-central levels.

In Table 3.9 we concentrate on the composition of the 20 consolidation attempts identified in the sub-central government data that do not correspond to consolidation attempts at the general government level.

A striking feature of consolidation attempts enacted by sub-central tiers alone is that cuts in capital expenditure dwarf those in other components of expenditure, and

the wage bill actually increases as a percentage of GDP[22]. Overall, cuts in capital expenditure occur in 15 out of the 20 observed consolidations while cuts in current expenditure occur in only 9 instances.

We can surmise that this bias toward capital spending demonstrated in Tables 3.8 and 3.9 may reflect a lack of alternatives given allocated spending commitments and constraints on required standards of provision imposed by central governments. It is also potentially consistent with myopic behaviour of local politicians who may wish to preserve current services at the expense of public investment. Finally, if the benefits of sub-central investment are not all captured within the region, externalities in the form of spillovers to other regions may also result in a tendency to under-provision when financing constraints are tightened.

[22] The figures for spending on goods and services and for total expenditure are somewhat influenced by two outliers relating to Finland and the UK in 1975. Upon elimination of these two observations the change in current expenditure falls from +0.05 to –0.01 and the clear message that the relative burden of expenditure adjustment is centred upon public sector investment remains.

Table 3.9: Composition of Adjustments During Lone Sub-Central Consolidation Attempts[23]
(each shown as % of GDP)

Expenditure				
Current Expenditure	of which:			Capital Expenditure
	Goods and Services	Wage Bill	Transfers and subsidies	
0.05	-0.01	0.04	0.02	-0.12
(0.76)	(0.19)	(0.44)	(0.32)	(0.25)

Revenue			
Taxation, of which:		Non-Tax Revenues	Grants
Total	Own-Taxes		
0.25	0.21	0.04	0.29
(0.57)	(0.50)	(0.18)	(0.62)

Relative to the pattern observed during general government consolidations, in lone sub-central consolidations changes in revenues appear to be relied upon more extensively. The revenue raising comes from both autonomous sources (i.e. "own" tax revenues and to a far lesser extent non-tax revenues), as well as higher grants allocations from central government[24].

In summary, there are clear distinctions between changes in sub-central revenues and expenditures that occur as part of a general fiscal adjustment and those that occur during an independent consolidation implemented by the sub-central tier.

[23] Standard deviations are given in brackets.
[24] The figures for changes in grants also contain two substantial positive outliers, which match those in the current expenditure calculations above. In fact these sub-central consolidations were conducted in conjunction with a period of decentralisation involving increases in sub-central current expenditure financed by increased top-down grants. Following elimination of these two observations the average change in grants falls to 0.19.

When central government consolidates it may force sub-central governments to cut particular expenditures, such as the wage bill, perhaps in part through centrally agreed pay settlements or through the grant system. In contrast, when sub-central governments consolidate alone, it would appear that the brunt of the adjustment is made in own tax revenues and capital expenditure, often assisted by increases in grant allocations from the central tier.

3.5. Conclusion

In this chapter we have examined fiscal consolidation attempts across a range of OECD countries. In doing so, we have studied consolidation attempts at both the general and the sub-central tiers of government. Our main contribution has been to explore the implications of fiscal decentralisation for fiscal consolidation, an issue which appears to have been ignored in the empirical literature to date.

We have demonstrated that most successful consolidation attempts involve concerted adjustments by both central and sub-central tiers of government. A result from the existing literature, that successful general government consolidations tend to be based upon expenditure cuts as opposed to increases in revenue, has been verified. We have also revealed that the sub-central tier is crucial in achieving cuts in both capital and current expenditure, and particularly in the wage bill, a key area in which cuts appear to result in sustained improvement. We conclude that sub-central governments play a crucial role in contributing to the success of a general consolidation. Further, we have shown that cuts in grants from central to sub-central

tiers of government tend to be made during successful consolidation attempts. We suggest that these cuts act as both a visible signal of the central government's intention to consolidate but that they also 'force the hand' of the sub-central tier for, given their typically limited alternative sources of revenues, even marginal changes in grants can have a major impact on expenditure. An apparent downside appears to be the extent to which forced adjustments to sub-central expenditures appear to be borne by cuts in capital as opposed to current expenditures.

The behaviour of sub-central tiers appears to differ, depending upon whether adjustment is conducted as part of a general government consolidation effort or is conducted by the sub-central tier in isolation. The latter concentrate upon revenue increases and cuts in capital expenditure, rather than focusing on areas that have been shown to result in more sustainable improvements in fiscal balances at the general government level.

One limitation with this analysis is that the focus has been limited to contemporaneous changes in fiscal policy. It is clearly of interest to examine the behaviour of fiscal policy at the central and sub-central levels in the periods immediately before and following consolidation attempts. This would enable an improved understanding of the factors which make certain consolidation attempts more or less likely to be successful. We address this issue in Chapter 4.

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3.7. Appendix: Robustness Tests

In this section we demonstrate the robustness of our analysis outlined in the main body of the chapter to the different methodological approaches discussed in Chapter 2.

As outlined in that chapter it is possible to obtain a different measure of discretionary fiscal policy than the BFI. In the first part of this appendix, we test whether our key results in sections 3.4 and 3.5 alter if we use a measure of discretionary fiscal impulse based upon the HP filter or OECD output gaps. In part 2, we test the robustness of our results to alternative identification criteria of both consolidation and success.

To limit space, we provide evidence of the robustness on a select few of the tables in the main text –

i) size of fiscal impulse,

ii) changes in total expenditure and revenue, and

iii) the composition of total expenditure and total revenue.

Part (a): Alternative Measures of Discretionary Fiscal Impulse

i) Discretionary Fiscal Impulse:

Table A3.1(a): Discretionary Fiscal Impulses During General Government Consolidation Attempts
(each shown as % of GDP)

HP Filter (30)				
All/Successful/Failed	All, n=58	S, n=22	F, n=36	signif:
Central	2.00	2.28	1.84	
Sub-Central	0.50	0.69	0.37	*
HP Filter (100)				
All/Successful/Failed	All, n=59	S, n=25	F, n=34	signif:
Central	2.15	2.56	1.85	***
Sub-Central	0.30	0.30	0.30	
OECD Output Gap				
All/Successful/Failed	All, n=59	S, n=25	F, n=34	signif:
Central	2.12	2.55	1.79	***
Sub-Central	0.36	0.32	0.38	

ii) Expenditure and Revenue

Table A3.2(a): Expenditure and Revenue Changes During General Government Consolidation Attempts
(each shown as % of GDP)

HP Filter (30)

	Total Expenditure				Total Revenue			
	All, n=58	S, n=22	F, n=36	signif	All, n=58	S, n=22	F, n=36	signif
Central	-0.17	-1.13	0.44	***	0.86	0.77	0.91	
Sub-Central	-0.22	-0.55	-0.01	***	0.22	0.31	0.29	

HP Filter (100)

	Total Expenditure				Total Revenue			
	All, n=59	S, n=25	F, n=34	Signif	All, n=59	S, n=25	F, n=34	signif
Central	-0.23	-1.07	0.39	***	0.77	0.68	0.84	**
Sub-Central	-0.24	-0.52	-0.03	***	0.21	0.09	0.29	***

OECD Output Gap

	Total Expenditure				Total Revenue			
	All, n=59	S, n=25	F, n=34	signif	All, n=59	S, n=25	F, n=34	signif
Central	-0.42	-1.20	0.16	***	0.71	0.62	0.77	**
Sub-Central	-0.31	-0.53	-0.16	***	0.15	0.09	0.19	***

iii) Composition of Expenditure Adjustment

Table A3.4(a): Changes in Components of Current Expenditure During General Government Consolidations
(each shown as % of GDP)

HP Filter (30)

	Goods and Services				Social Transfers & Subsidies				Wage Bill				Capital Expenditure			
	All	S	F	Sig	All	S	F	Sig	All	S	F	Sig	All	S	F	Sig
C	0.00	-0.03	0.02		-0.12	-0.53	0.15		-0.10	-0.12	-0.08		-0.10	-0.13	-0.08	
S-C	0.02	-0.01	0.05		-0.06	-0.11	-0.03	***	-0.05	-0.15	0.02	***	-0.10	-0.16	-0.06	***

HP Filter (100)

	Goods and Services				Social Transfers & Subsidies				Wage Bill				Capital Expenditure			
	All	S	F	Sig	All	S	F	Sig	All	S	F	Sig	All	S	F	Sig
C	0.00	-0.04	0.01		-0.15	-0.53	0.13		-0.10	-0.12	-0.08		-0.07	-0.12	-0.04	
						0.23	0.17				0.07			0.04	0.05	
S-C	0.01	-0.02	0.04	***	-0.07	-0.11	-0.03	***	-0.05	-0.14	0.02	***	-0.10	-0.14	-0.07	***

OECD Output Gap

	Goods and Services				Social Transfers & Subsidies				Wage Bill				Capital Expenditure			
	All	S	F	Sig	All	S	F	Sig	All	S	F	Sig	All	S	F	Sig
C	-0.02	-0.04	0.00		-0.23	-0.57	0.01	***	-0.08	-0.13	-0.04		-0.10	-0.12	-0.10	
S-C	-0.02	-0.05	0.00		-0.07	-0.12	-0.03	***	-0.10	-0.16	-0.06	***	-0.10	-0.13	-0.07	*

iv) Composition of Revenue Adjustment

Table A3.5(a): Composition of Changes in Revenue During Consolidation Attempts
(each shown as % of GDP)

HP Filter (30)

	Tax Revenues				Non-Tax Revenues				Grants			
	All	S	F	Sig	All	S	F	Sig	All	S	F	Sig
Central	0.75	0.77	0.74		0.08	-0.07	0.17		0.02	0.00	0.03	
Sub-Central	0.18	0.18	0.20		0.02	-0.07	0.07		-0.12	-0.39	0.06	***

HP Filter (100)

	Tax Revenues				Non-Tax Revenues				Grants			
	All	S	F	Sig	All	S	F	Sig	All	S	F	Sig
Central	0.69	0.68	0.70		0.06	-0.06	0.15	***	0.02	0.00	0.04	
Sub-Central	0.17	0.13	0.20	**	0.00	-0.07	0.07	***	-0.13	-0.37	0.05	***

OECD Output Gap

	Tax Revenues				Non-Tax Revenues				Grants			
	All	S	F	Sig	All	S	F	Sig	All	S	F	Sig
Central	0.64	0.63	0.64		0.03	-0.08	0.11	***	0.02	0.00	0.04	
Sub-Central	0.09	0.08	0.10		0.00	-0.06	0.05	***	-0.17	-0.40	0.00	***

Part (b): Consolidation Attempts using Definition 1(a) – i.e. Allowing for Two Year Consolidation Attempts

i) Discretionary Fiscal Impulse:

Table A3.1(b): Discretionary Fiscal Impulses During General Government Consolidation Attempts
(each shown as % of GDP)

All/Successful/Failed	All, n=61	S, n=22	F, n=39	signif:
Central	2.01	2.35	1.79	**
Sub-Central	0.44	0.46	0.43	

ii) Expenditure and Revenue

Table A3.2(b): Expenditure and Revenue Changes During General Government Consolidation Attempts
(each shown as % of GDP)

	Total Expenditure				Total Revenue			
	All, n=61	S, n=22	F, n=39	signif	All, n=61	S, n=22	F, n=39	signif
Central	-0.47	-1.16	-0.20	***	0.83	0.52	0.86	*
Sub-Central	-0.35	-0.60	-0.09	***	0.10	0.01	0.16	

iii) Composition of Expenditure Adjustment

Table A3.4(b): Changes in Components of Current Expenditure During General Government Consolidations
(each shown as % of GDP)

	Goods and Services				Social Transfers & Subsidies				Wage Bill				Capital Expenditure			
	All	S	F	Sig	All	S	F	Sig	All	S	F	Sig	All	S	F	Sig
C	-0.07	-0.14	-0.02	**	-0.23	-0.75	0.10	***	-0.15	-0.21	-0.12	*	-0.16	-0.14	-0.17	
S-C	-0.01	-0.08	0.03	*	-0.08	-0.20	-0.01	***	-0.14	-0.24	-0.08	***	-0.09	-0.16	-0.05	*

iv) Composition of Revenue Adjustment

Table A3.5(b): Composition of Changes in Revenue During Consolidation Attempts
(each shown as % of GDP)

	Tax Revenues				Non-Tax Revenues				Grants			
	All	S	F	Sig	All	S	F	Sig	All	S	F	Sig
Central	0.71	0.74	0.68		0.00	-0.20	0.13	***	0.01	0.00	0.02	
Sub-Central	0.06	0.03	0.07		0.02	-0.07	0.07	***	-0.19	-0.51	0.02	***

Part (c): Measure of Success using Definition 2(a) – i.e. Using improvement in Structural Balance as Additional Measure of Success[25]

i) Discretionary Fiscal Impulse:

Table A3.1(c): Discretionary Fiscal Impulses During General Government Consolidation Attempts
(each shown as % of GDP)

All/Successful/Failed	All, n=61	S, n=29	F, n=32	signif:
Central	2.14	2.39	1.90	*
Sub-Central	0.37	0.37	0.36	

[25] We cannot determine the success or failure of consolidations in France (1997) and Canada (1982). While these two observations do not satisfy our criteria based upon the necessary improvement in the debt to GDP ratio we do not have sufficient data on the structural deficit for the post consolidation period. In addition, the UK adjustment of 1996 does not have three full years afterwards to determine success, instead we base our judgement on the structural deficit performance over two years.

ii) Expenditure and Revenue

Table A3.2(c): Expenditure and Revenue Changes During General Government Consolidation Attempts
(each shown as % of GDP)

	Total Expenditure				Total Revenue			
	All, n=61	S, n=22	F, n=39	signif	All, n=61	S, n=22	F, n=39	signif
Central	-0.51	-1.08	-0.11	***	0.78	0.51	1.05	*
Sub-Central	-0.34	-0.51	-0.08	**	0.13	-0.02	0.27	**

iii) Composition of Expenditure Adjustment

Table A3.4(c): Changes in Components of Current Expenditure During General Government Consolidations
(each shown as % of GDP)

	Goods and Services				Social Transfers & Subsidies				Wage Bill				Capital Expenditure			
	All	S	F	Sig	All	S	F	Sig	All	S	F	Sig	All	S	F	Sig
C	-0.06	-0.09	-0.04		-0.25	-0.67	0.16	***	-0.15	-0.22	-0.08	**	-0.16	-0.15	-0.17	
S-C	-0.02	-0.06	0.01		-0.07	-0.16	0.01	**	-0.13	-0.24	-0.03	***	-0.11	-0.11	-0.10	

iv) Composition of Revenue Adjustment

Table A3.5(c): Composition of Changes in Revenue During Consolidation Attempts
(each shown as % of GDP)

	Tax Revenues				Non-Tax Revenues				Grants			
	All	S	F	Sig	All	S	F	Sig	All	S	F	Sig
Central	0.71	0.67	0.75		0.02	-0.16	0.20	***	0.02	0.03	0.00	
Sub-Central	0.08	-0.03	0.19	**	0.00	-0.05	0.06	*	-0.17	-0.35	0.00	***

CHAPTER 4

"Fiscal Federalism, Fiscal Consolidations and Cuts in Central Government Grants: Evidence from an Event Study[1]"

4.1. Introduction

In this chapter, we extend the analysis of Chapter 3 in two principle directions. Firstly, we re-examine central and sub-central government fiscal behaviour during national consolidation attempts however on this occasion, we offer comment not only on the year of consolidation but also the years immediately preceding and following the consolidation attempt. A limitation of our research in Chapter 3 and in the majority of the current literature has been to restrict the analysis of fiscal adjustment to the actual contemporaneous period of consolidation. The behaviour of fiscal policy in the periods surrounding consolidations has largely been ignored. For instance, in Chapter 3 we examined the adjustments to central and sub-central fiscal policy in years of general government consolidation and discussed the factors which contributed to success. No effort was made however, to observe whether these consolidation attempts were part of a longer-term fiscal tightening or whether the adjustments were sustained in subsequent periods. Without full knowledge of such issues, it is unlikely that a complete understanding of successful and unsuccessful

[1] We are grateful to participants at the TAPES Conference on 'Fiscal Federalism' and especially our discussants, Thiess Buettner and Denis Epple for very useful comments on an earlier version of this paper. We are also grateful to particpants at the European Regional Science Association 2004 Conference and at the Irish Economic Association 2004 Conference for comment and discussion.

consolidations can be obtained. While there have been a number of studies which have looked at the duration of consolidation attempts again however, such studies only focus on behaviour during the identified consolidations, all be it, the time duration is endogenous. A major contribution of this Chapter is to outline and apply an econometric technique whereby fiscal policy both in the period of consolidation and in surrounding periods can be analysed in a clear and insightful manner.

In the second major extension we undertake a closer examination of the behaviour of sub-central governments in response to grant cuts. As observed in Chapter 3, a key element of successful consolidations are large and significant cuts in central to sub-central grants. We concluded that there was some evidence of central government's 'forcing the hand' of sub-central tiers into cutting their expenditures. The behaviour of sub-central governments in response to grant cuts is clearly of interest and we therefore extend our analysis by shifting focus away from consolidation attempts to years when central to sub-central grants were cut. While there is a substantial literature on the response of states in the USA to cuts in federal transfers, we are unaware of any previous study which has examined such episodes on a cross-national basis.

To undertake these extensions, we focus on a natural experiment which allows us to explore changes in fiscal policy during episodes of interest[2]. The methodology we adopt can be classified as an event study approach. We believe that the use of this technique represents a major methodological improvement on previous

[2] Whilst it is difficult to analyse these issues in countries where the relationship between tiers of government has changed over time, we take account of major shifts in fiscal responsibility.

documentation of the 'stylised facts' of fiscal consolidation attempts and cuts in grants.

Our analysis highlights a number of important points. First, successful general government consolidations bring with them similar, *and sustained*, cuts in expenditure at both the central and sub-central levels. Indeed a pattern emerges for successful consolidations in which central governments cut intergovernmental transfers to lower tiers of government, who then cut back expenditure since they have difficulty in raising sub-central taxation revenues. There appears to be little evidence that sub-central governments react to cut-backs in grants by increasing their own-source revenues, in contrast to Gramlich (1987)[3].

Second, unsuccessful consolidations tend to be characterised by *temporary* increased taxation at the central level, with no fall back in intergovernmental grants and no tendency for sub-central taxation to change. It appears that there is a strong correlation between success in consolidating central fiscal deficits and similar actions from lower tiers of government.

Third, in line with the results obtained in Chapter 3, we find that where consolidations are successful, sub-central tiers of government have to significantly cut-back on their capital expenditures. However, given the methodological approach adopted in this chapter we are able to demonstrate that such cut-backs appear sustained. This suggests that the burden of adjustment falls onto lower tiers of government and that central governments worry less about the long-term (i.e. public investment) consequences of consolidation if these decisions are taken at local level.

[3] Note that the study by Gramlich (1987) is limited to USA states.

In addition, there is evidence that when faced with cuts in intergovernmental grants during consolidations, sub-central governments tend to maintain expenditures on wages at the expense of capital expenditure. Thus, there seems to be a definite switch towards public consumption. This might be interpreted as a variant of the effect identified by Gramlich (1987) in that sub-central governments seek to defend current services as opposed to spending on infrastructure rather than raising taxation. This could be explained by the fact that in many of the OECD countries in our sample the states/regions and local authorities have much more limited powers to vary taxation than in the USA.

Fourth, our results shed some light on how sub-central governments react to cuts in grants and thus, at least indirectly, on the 'flypaper' effect[4], by showing that it operates in reverse. As discussed above, it appears that successful fiscal consolidations are characterised by cut-backs in intergovernmental grants, which are more than matched by cut-backs in sub-central expenditures. In contrast, periods of unsuccessful consolidation, which are characterised by increases in central taxation and no change in intergovernmental grants, show only a small temporary reduction in sub-central expenditures. By examining in more detail episodes where central governments cut back grants to lower tiers of government, rather than just periods of significant fiscal consolidation, we find that this result is robust. Not only do sub-central governments react to a cut in grants by cutting expenditures, but remarkably those countries with structures which are more decentralised and apparently involve

[4] It should be stressed that originally (Gramlich, 1977) the term 'flypaper' effect was used to describe the observation that the expenditure stimulus to local public expenditures from unconditional grants was in excess of equal increases in private income. However, since then, empirical studies (see e.g. Gamkhar and Oates, 1996, and Oates, 1999) have associated the term 'flypaper' with tests of the extent to which changes in government grants impact on local expenditures without reference to changes in private income. We discuss the 'flypaper' effect in more detail in Section 4.3.

greater fiscal autonomy tend to cut expenditures by more, and seem reluctant to raise sub-central taxes. This reverse 'flypaper' effect might highlight either a low degree of effective fiscal autonomy, or a high effective degree of tax competition at sub-central level which prevents any offsetting increase in local taxation. This contrasts with the hypothesis that more decentralised fiscal arrangements lead to a lower degree of macroeconomic control (cf. Tanzi, 2001, Rodden, 2002, Rodden and Wibbels, 2002), or to a greater degree of taxation (see Keen, 1997), with the qualification that central governments retain a degree of control through their grant allocations[5].

Finally, we find that the institutional arrangements in countries (the government type and the nature of the fiscal arrangements) impact at the margin on the results, and in particular that coalition governments tend to find it more difficult to cut grants to sub-central governments during fiscal consolidations.

The chapter is structured as follows. In Section 4.2 we outline the event study approach adopted and in addition, we discuss in detail the econometric estimation techniques applied. In Section 4.3, we present and discuss our results with respect to general government consolidation attempts. While verifying many of our previously established results from Chapter 3 we also highlight the new insights obtained using this estimation technique. In Section 4.4 we examine episodes of cuts in central government grants. Section 4.5 concludes.

[5] We test this hypothesis directly in Chapter 6.

4.2 Event Study Methodology

4.2.1 Introduction

Event studies provide a method, based on regression analysis, to examine the collective time profile of key time series variables of interest around the time of defined events, in our case fiscal consolidations or cuts in central government grants. Event studies have a long history in applied econometrics with the first recognised study that of Dolly (1933). These types of studies are less common in macroeconomics, but are more commonplace in Financial economics[6]. For instance, in Finance these methods have been used to examine the impact of 'news' on share prices such as the announcement of profit figures, in the immediate and surrounding periods. A survey of the use of event studies in the determination of corporate asset prices is given by Brown and Warner (1985).

In our case, by using event analysis we can compare and contrast changes in key fiscal variables before, during and after a year of fiscal consolidation/cut in grants with respect to 'normal' or reference conditions. In doing so, we can obtain a descriptive time profile of all the fiscal variables of interest during the period of consolidation/cut in grants and periods immediately prior to and after the 'event'. The lack of a specified structural model in our estimation is a clear advantage as by not imposing priors or theoretical structure we can obtain a clear pattern of the stylised facts during both consolidation attempts and episodes of intergovernmental grant cuts.

[6] See for instance MacKinlay (1997) and Campbell *et al.* (1997).

Our event study analysis will highlight patterns in the data demonstrating for example, whether fiscal reforms in period T were sustained, by comparing the behaviour both in period T and in the immediate aftermath with 'normal' conditions. By construction, while we should expect adjustments in fiscal policy in the period of the identified 'event', fiscal behaviour before and after this event is as yet unexplored. By applying event analysis we are able to identify patterns in the data which could not be identified when using the methodology applied in Chapter 3.

When conducting event analysis, three tasks have to be addressed at the very outset. Firstly, the 'event' of interest must be defined. Secondly, the duration of the period upon which the analysis will focus has to be established: this is termed the 'event window'. Finally, the econometric methodology to estimate the constructed model needs to be specified. We deal with each issue in turn.

: Definition of Event

In our analysis, the 'event' corresponds to either a general government consolidation attempt or a cut in central to sub-central government grants. In the case of consolidation attempts, our 'events' are the identified general government consolidation attempts outlined in Chapter 2. To remain consistent with the analysis conducted in Chapter 3, our identified consolidation attempts are those fiscal years which meet the requirements of Definition 1. In addition, we differentiate these consolidations according to whether or not they are deemed to be successful according to Definition 2.

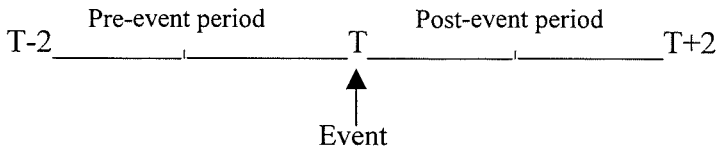
In our study of changes in intergovernmental grants however, cuts in central to sub-central grants as a percentage of total sub-central revenues now represent the 'event', rather than consolidation attempts. The variable in question is the change in grants (at constant prices) as a percentage of the previous period's total revenue (at constant prices), i.e. $((G_t-G_{t-1})/TR_{t-1})*100$. Here, unlike consolidations, we focus on all cuts in grants in real terms, which provides us with a total sample of 86 episodes. From these we exclude two, the UK in 1990/91, and Spain in 1985/86, where the adjustments in grants were linked to a major reform in local government finance, and hence did not represent an attempt to change the fiscal balance between tiers of government without an associated reform in local/state government finance. A list of all the episodes which are part of our sample is provided in Table 4.1.

Table 4.1 Chronology of Grant Cuts

	Year of Cut in Grants
USA	1983
UK	1977, 78, 79, 80, 82, 85, 88, 93, 95, 97 & 98
Austria	1985 & 89
Belgium	1981, 82, 87, 88, 89, 92, 96 & 97
Denmark	1981, 83, 84, 85, 86, 87, 95, 96 & 97
France	1984 & 96
Germany	1976, 77, 81, 82, 83, 93,94,95,97 & 98
Netherlands	1980, 84, 86, 87, 89, 93, 94 & 96
Norway	1977, 93, 95 & 96
Sweden	1978, 82, 83, 85, 86, 88, 91, 94, 95, 96 & 99
Canada	1980, 84, 86, 88, 93, 95, 96 & 97
Finland	1993
Ireland	1984, 86, 88, 89
Spain	1997
Australia	1982, 86, 87, 88 89, 94
Total	88

: Duration of Event Window

We define an event window of five years, i.e. two years prior to the event (i.e. consolidation or grant cut), the event period itself, and the two years following the event[7]. The width of the event window can, as we shall see below, be altered if some of the time dummies used in the regression analysis are not significant. The following figure contains the time line for our event window.



: Estimation Technique

The econometric methods used are similar to those employed by Tornell and Westermann (2002) in an analysis of business cycles around the time of financial crises. Panel data methods are applied, where the panel regressions include Fixed Effects to account for cross-country heterogeneity and use Weighted Least Squares (WLS) to account for the effects of heteroscedasticity[8].

[7] Given we are dealing with annual data we feel that this length of Event Window is most appropriate. We have tested extending the Event Window and our results remain robust. However, statistical and economic inference is more limited as more than two years distant from the 'event' is a long time in fiscal policy terms.

[8] In a recent paper Bertrand *et al.* (2004) note that 'difference in differences' estimates might be affected by the presence of serial correlation. Although our study is not a conventional 'difference in differences' study, the presence of serial correlation may result in inconsistent standard error estimates. In order to check if this is a problem, we conducted two robustness checks: first we added a lagged dependent variable to our event study regressions; and second, we re-estimated our regressions using a GLS (Cochrane-Orcutt) estimator. In all cases we found little change in the sign, size and significance of the time dummy variables. We continue to report the OLS estimates because of the difficulty in plotting event windows in the presence of lagged dependent variables. We are grateful to our discussant at the NBER/CESifo TAPES 'Fiscal Federalism' conference, Thiess Buettner, for pointing this issue out to us.

$$y_{it} = \alpha_i + X_{it}\beta + \varepsilon_{it} \qquad (4.1)$$

The X_{it} matrix is comprised of a series of time dummies designed to capture the time profile of changes in the fiscal variables of interest. More precisely, the time dummies capture the differences between each period in the event window and either non-consolidation years or years when grants were not cut for our consolidation study and our cuts in grant study respectively. We present a fuller discussion of the time dummies in Section 4.2.

With Fixed Effects, the individual country α_i's are allowed to differ by estimating different constants for each cross section[9]. This is important as it allows us to conduct our analysis on a cross-national database. As highlighted above, much of the literature on sub-central behaviour during cuts in intergovernmental grants has been limited to US data. In addition, such studies tend to focus on specific jurisdictions such as individual school districts. In adopting this methodology we are able to offer the first cross-country examination of changes in sub-central fiscal policy during changes in intergovernmental transfers.

4.2.2 Estimation Technique: General Government Consolidations

To apply event study methods to our consolidation attempts we carry out two sets of regressions.

[9] For a discussion of the use of Fixed Effects in more general see Baltagi (1994).

First we examine all consolidation attempts collectively, where T denotes the actual year of consolidation:

$$y_{i,t} = \alpha_i + \beta_1 D_{i,T-2} + \beta_2 D_{i,T-1} + \beta_3 D_{i,T} + \beta_4 D_{i,T+-1} + \beta_5 D_{i,T+2} + \varepsilon_{1i,t} \qquad (4.2)$$

where y_{it} is the fiscal variable of interest in country i at period t, and $D_{i,T\pm j}$ are time dummies, equal to 1 in +j/-j periods from the consolidation period, and zero in all other periods.

Second, we subdivide the identified fiscal consolidations into the 'successful' and 'unsuccessful' categories and perform the following regression:

$$\begin{aligned} y_{i,t} = {} & \alpha_i + \delta_1 D^S_{i,P-2} + \delta_2 D^S_{i,P-1} + \delta_3 D^S_{i,P} + \delta_4 D^S_{i,P+1} + \delta_5 D^S_{i,P+2} \\ & + \varphi_1 D^U_{i,Q-2} + \varphi_2 D^U_{i,Q-1} + \varphi_3 D^U_{i,Q} + \varphi_4 D^U_{i,Q+1} + \varphi_5 D^U_{i,Q+2} + \varepsilon_{2i,t} \end{aligned} \qquad (4.3)$$

where again y_{it} is the fiscal variable of interest in country i at period t, $D^S_{I,P\pm j}$ are time dummies, equal to 1 in +j/-j periods from the successful consolidation period (denoted t=T) and zero in all other periods, and $D^U_{I,Q\pm j}$ are time dummies, equal to 1 in +j/-j periods from the unsuccessful consolidation period (denoted t=V) and zero in all other periods.

Each estimated coefficient (β_k, δ_k, ζ_k) captures the estimated difference between period k in the event window and the average position in non-consolidation years. Thus, for instance, if the dependent variable is the annual change in central government expenditure, a significantly negative β_2 implies that in the year prior to

the consolidation the change in central government expenditure was significantly lower than in non-consolidation years (the 'normal', or reference period).

As we shall see below, having estimated the standard event study regression it may be useful to see if individual countries or groups of countries display significantly different behaviour from the rest of the countries in the event sample. For instance, we might wish to consider whether those countries with different types of government (e.g. coalition or single-party governments) display different behaviour in terms of fiscal adjustment at central and sub-central level. Or we might want to consider if countries with federal rather than unitary structures display a different adjustment pattern. Equation 4.2 can be modified as follows, to include an interactive dummy variable:

$$y_{i,t} = \alpha_i + \beta_1 D_{i,T-2} + \beta_2 D_{i,T-1} + \beta_3 D_{i,T} + \beta_4 D_{i,T+1} + \beta_5 D_{i,T+2} + \lambda_1 C_l D_{i,T-2} + \lambda_2 C_l D_{i,T-1} + \lambda_3 C_l D_{i,T} + \lambda_4 C_l D_{i,T+1} + \lambda_5 C_l D_{i,T+2} + \varepsilon_{3i,t} \quad (4.4)$$

where C_l is a dummy variable which takes a value of unity in the case of a particular country or group of countries and is equal to zero in all other cases. The estimated coefficient on the interactive dummy variable captures the additional effect of this category of country over and above the standard dummies. For instance, taking the previous example, if C_l is a dummy representing the current Eurozone countries, a significantly negative λ_3 would indicate that in the year of consolidation central government expenditure is significantly lower than in non-Eurozone countries during fiscal consolidations.

4.2.3 Estimation Technique: Cuts in Grants

As before, the basic event study regression is given as follows, where T now denotes the actual year of the cut in grant:

$$y_{i,t} = \alpha_i + \beta_1 D_{i,T-2} + \beta_2 D_{i,T-1} + \beta_3 D_{i,T} + \beta_4 D_{i,T+-1} + \beta_5 D_{i,T+2} + \varepsilon_{4i,t} \qquad (4.5)$$

where y_{it} is the fiscal variable of interest in country i at period t, and $D_{i,t+j}$ are time dummies, equal to 1 in +j/-j periods from the period where the cut takes place, and zero in all other periods. As above, we focus on a variety of different variables: total expenditure, taxation, fees and user-charges, the wage bill, social transfers, expenditure of goods and services, and capital expenditure.

It is also informative to divide the events into two categories, defined by 'large' and 'small' cuts in grants. These are defined below. We then perform the following event study regression:

$$\begin{aligned} y_{i,t} = {} & \alpha_i + \delta_1 D^L_{i,P-2} + \delta_2 D^L_{i,P-1} + \delta_3 D^L_{i,P} + \delta_4 D^L_{i,P+1} + \delta_5 D^L_{i,P+2} \\ & + \varphi_1 D^S_{i,Q-2} + \varphi_2 D^S_{i,Q-1} + \varphi_3 D^S_{i,Q} + \varphi_4 D^S_{i,Q+1} + \varphi_5 D^S_{i,Q+2} + \varepsilon_{5i,t} \end{aligned} \qquad (4.6)$$

where again y_{it} is the fiscal variable of interest in country i at period t, $D^S_{I,P\pm j}$ are time dummies, equal to 1 in +j/-j periods from the period when the small cut in grants took place (denoted t=T) and zero in all other periods, and $D^L_{I,Q\pm j}$ are time dummies, equal

to 1 in +j/-j periods from the period in which the large cut in grants took place (denoted t=V) and zero in all other periods.

As shown in equation 4.4, we can modify this regression to take account of particular individual or groups of countries to see if their behaviour deviates from that of other countries in the sample.

A popular approach in event study analysis is to formally test whether or not there is a statistical difference in the variable(s) being analysed between the pre- and the post-event period. Two such methods are the Non-Parametric Sign for the Median and Paired-Sample Means tests[10].

Such techniques however, are of less relevance for our analysis. Our goal is to obtain a time profile of fiscal variables not only in the year of consolidation or cut in grants but also in the surrounding years. Thus, whether changes in fiscal variables are different in the pre-event versus the post-event periods is of little direct concern. We wish to examine whether behaviour in both periods are different from 'normal' (i.e. reference conditions) across the whole sample. Instead therefore, we adopt a graphical approach in line with Tornell and Westermann (2002) and Eichengreen and Arteta (2000).

Each figure is sub-divided into a number of panels. The upper row of graphs in each panel shows the time profile for the fiscal variable of interest (e.g. fiscal impulse, change in expenditure etc) for respectively, all consolidations, successful

[10] For an example application of such approaches, see MacKinlay (1997).

consolidations and unsuccessful consolidations. Alongside the coefficients we also plot the standard error bands which allow easy identification of the time periods in which the time profile implies a change which is significantly different from zero. The lower row of graphs in each panel shows the *cumulative* change in the fiscal variable of interest, obtained by summing the respective coefficients over all periods. Again, for the cumulative effect we show asymptotic standard error bands[11].

4.3. Results from Consolidations Event Study

The results of this consolidation event study are presented as a series of graphs, shown in Figure 4.1, panels A to V. As noted above, we consider all the consolidations which fall into Definition 1, and then sub-divide them into the categories of successful and unsuccessful, using Definition 2.

Panel A shows the extent to which these consolidations involve an improvement in the fiscal position of the central government, as measured by the annual change in the Blanchard fiscal impulse. As can be seen from panel A, fiscal consolidations involve sizeable central government fiscal impulses in period T. It is also interesting to note that the time profile of the consolidations around period T is very similar regardless of whether the fiscal consolidation is ultimately successful or not. As can be seen from the cumulative graphs however, the successful fiscal

[11] These asymptotic standard errors bands are calculated using the respective Variance Covariance matrix and the fact that the variance of a linear combination of independent parameters (b_1 and b_2) is equal to $var(b_1) + var(b_2) + 2cov(b_1,b_2)$

consolidations typically involve a larger cumulative positive fiscal impulse, as the improvements at time T are amplified in post-consolidation periods.

Panel B shows the discretionary fiscal impulse implemented by the sub-central tiers of government, and shows how they fared during these fiscal consolidation attempts. It is interesting to note that our results support our conclusion in Chapter 3 that the consolidation effort is shared between tiers of government. All period T dummies attract positive and statistically significant coefficients, suggesting that the change in the discretionary fiscal balance is more favourable during consolidation years as opposed to non-consolidation years[12]. Interestingly, we see that there is a major difference between successful and unsuccessful consolidations: in the former, sub-central tiers of government share a considerable part of the burden of macroeconomic adjustment. The other point to note is that in the period following the discretionary fiscal tightening there is a partial reversal at sub-central level (the T+1 dummies are significantly negative). This may indicate some resistance to the consolidation effort.

Rodden (2002) and Rodden and Wibbels (2003) as well as Tanzi (2001), have argued that greater fiscal decentralisation might result in a potential deterioration in macroeconomic control, as sub-central tiers of government have the incentive to myopically focus on local issues. Whilst we do not attempt to answer this question directly in this chapter (see Chapter 6), we do examine the extent to which the most decentralised countries contribute to overall consolidation attempts, and gauge

[12] Note that the movement in the sub-central impulse will also be affected by any change in grants from central government.

whether there is evidence of greater resistance to central government consolidation efforts within such countries. In Figure 4.1, panel C we have divided the sample into countries with 'high' and 'low' degrees of fiscal decentralisation. To be precise, we divide our set of countries into these two categories on the basis of the percentage of expenditure and revenue assignment at the sub-central level, with seven countries in the 'high' category[13]. Figure 4.1 (panel C) shows clearly that the fiscal impulse is larger in the 'highly decentralised' countries at time T, involving an improvement relative to non-consolidation years of 0.5% of GDP). Thus, this exploratory analysis suggests that a high degree of decentralisation does not seem to be inconsistent with sub-central tiers of government sharing the burden of adjustment. As we shall see below, concurrent cuts in central government grants appear to be an important element behind this shared adjustment.

Having looked at the time profile of the overall fiscal positions, we now examine the evolution of expenditures and revenues during the event window, both their total values and their individual components. As before, note that in the case of total expenditure we examine total primary expenditure excluding transfers, i.e. excluding interest payments and transfers to other levels of national government. Similarly total revenue includes all tax and non-tax revenues but excludes grants received from other tiers of national government. Intergovernmental grants and transfers are analysed separately.

[13] The countries were split into two groups along expenditure decentralisation lines, with seven countries in the 'high' category (Australia, Canada, Germany, Finland, Norway, Sweden and the USA), and eight in the 'low' category (Austria, Belgium, Denmark, Spain, France, the UK, Ireland, and the Netherlands). The results seem reasonably robust to a classification along different lines, e.g. overall fiscal decentralisation based on both expenditure and revenue considerations. In addition, we also attempted to differentiate our sample along a related characteristic, i.e. whether the countries are federal or unitary. In practice there is a substantial overlap between these two categorisations, and the results for 'federal' countries were similar to those for 'highly decentralised' countries.

Panels D and E in Figure 4.1 show the evolution of total expenditures in central and sub-central government. Panels F-M show the equivalent plots for the components of total expenditure (respectively wages, social transfer payments, goods and services and capital expenditure). A number of points can be noted from these results. First, as can be seen from panels D and E, the key difference between successful and unsuccessful consolidations is that expenditure is tightened consistently over time during successful consolidations, and not just in the period where the consolidation takes place (T). This sustained cut is evident in the majority of the components of spending, with the exception of central government capital expenditure which we discuss below. Furthermore, this progressive tightening is also evident at the sub-central level, confirming the important role of the sub-central tier. Second, as discussed in Chapter 3, cuts in social welfare spending and wages tend to distinguish successful consolidation, and that this is linked to an important signalling effect: by cutting these types of expenditures central governments can indicate an important commitment to fiscal control. Panels F and G confirm this: while significant and sustained cuts are made in the central government wage bill across both successful and failed consolidations, the size of the cut is clearly larger, and the demonstration effect stronger, in the successful case. Third, as discussed above, it is usually argued (Alesina and Perotti 1995, 1997, and McDermott and Wescott, 1996) that capital expenditure cuts tend to be unsustainable and hence are more of a feature of unsuccessful consolidations. Panels L and M show that capital expenditure cuts by central governments do tend to be larger during unsuccessful consolidations, but that the picture is reversed at sub-central government. As the analysis in the previous chapter suggested, it does appear that some of the pressure on sub-central

governments is translated into lower levels of public investment, and the difference between successful and unsuccessful consolidations is particularly marked.

Turning now to the revenues side, Panels N-S in Figure 4.1 show the evolution of central and sub-central government revenues and their components. Panel N shows the point made in Chapter 3 that in the year of the consolidation unsuccessful attempts are characterised by increases in fiscal revenues rather than expenditure cuts in period T. Note that central government revenues rise in both successful and failed consolidation attempts, but that the new higher level of revenues is almost completely reversed in the next year, with a significant negative effect at T+1. Thus the cumulative change in revenues profile is not actually different for successful and failed consolidation attempts. This is something which is not evident from our analysis in Chapter 3 because we do not analyse the periods subsequent to the consolidation attempts. Panel O shows that unsuccessful attempts seem to be more characterised by an increase in sub-central governments' revenues. Breaking down revenues into taxation and other charges (including user charges), shown in panels P-S, one can see that although there is a tendency for sub-central governments to raise taxation in the period of the consolidation[14]. There is also a tendency for user charges and fees to be lower in the case of successful consolidations, although these effects are barely significant. We conclude that revenue adjustments appear to contribute little to the cumulative profile of fiscal consolidations at central or sub-central levels, and where present they appear to be more connected with unsuccessful consolidations or to be temporary measures.

[14] Although it should be remembered that we do not distinguish here between taxation increases where the base and yield is under the control of sub-central government and increases in shared taxation revenues.

What seems to matter more, in terms of fiscal consolidations, is the role played by intergovernmental grants and transfers. Panel T shows the extent to which central governments adjust sub-central grants around the time of fiscal consolidations. It is important to remember from our analysis in Chapter 1 that all the countries in our sample exhibit some degree of vertical imbalance in that expenditures at the sub-central tier exceed own-source revenues with the difference being financed by central government grants. Any changes in grants will therefore impact heavily on sub-central governments.

The significant negative dummies in periods T, T+1, and T+2 in the upper row of panel T shows that, relative to the reference category, grants to sub-central governments are cut substantially both during and after years of consolidation. It is also apparent that this result is driven almost entirely by successful consolidations. The cumulative change in grants during successful consolidations is about -1.3% of GDP, while the average change outside the event window is 0.2%. In contrast during unsuccessful consolidations the cumulative coefficient is insignificantly different from the average fixed effect. Clearly cuts in grants are central to fiscal consolidation efforts by central governments: by cutting the finance available to lower tiers of government they in effect force their hand. Below we will examine cuts in grants more closely, to see whether, and when, sub-central governments respond to such pressures by cutting expenditures, and when instead they choose to raise taxes. For the moment, at least when we focus on fiscal consolidations, there would appear to be a reverse 'flypaper' effect, in that cuts in grants lead to cuts in sub-central expenditure. Again, we will return to this theme below to see whether it applies more generally to all cases where central governments cut grants to lower tiers of government.

Finally, we examine the extent to which the nature and stability of the central government impacts on these fiscal decisions. Using the data provided in Budge *et al.* (2000), we differentiate the identified consolidation episodes along 'type of government' lines. Although Budge *et al.* define six alternative forms of government, we group these into three types: single party parliamentary majority, coalition parliamentary majority and parliamentary minority with a single party or a coalition). The form of government in the actual period of consolidation is used as the discriminating factor[15]. Panels U and V in Figure 4.1 show, respectively, the annual change in government expenditures by single party and coalition central governments, and the cuts in grants by these two categories of government. As can be seen in panel U, there is only a slight difference in the expenditure-cutting behaviour of single-party and coalition governments. However, panel V demonstrates that coalition governments are not able to cut sub-central grants. All single-party dummies are significantly negative at the 10% level. Cutting sub-central grants, like any other current expenditures is likely to be politically difficult and strong governments may find it easier to deal with the potential backlash from local government. The reluctance to address sub-central finances may partially explain the lower probability of success in fiscal consolidations of coalition governments widely discussed in the literature[16].

[15] Potentially different types of government can be in power across our event window. We find, however, that this happens rarely and does little to alter our results.
[16] For a fuller discussion of the political economy of fiscal consolidations see Chapter 6.

4.4. Cuts in Grants: How do Sub-Central Governments React?

4.4.1 Introduction

From the previous section and the analysis in Chapter 3 we observe that central governments engaged in fiscal consolidations use intergovernmental grant allocations as an important instrument for controlling public finances. We now broaden the horizon to ask how these moves to cut grants impact on the adjustment decisions made by lower tiers of governments. The reason for doing this is that fiscal consolidations may not be typical of a more general tendency for different tiers of governments to adjust financial flows between them. For instance, in the previous section we saw that cuts in grants during fiscal consolidations were not characterised by increases in taxation, but instead led to cuts in sub-central expenditures (including capital spending). In other words, fiscal consolidation seems to diminish fiscal decentralisation. Our goal in this section is to examine whether or not this result holds more generally in a wider range of circumstances not formally defined by an attempt to restore the public finances. Some writers have suggested for instance that changes in grants between tiers of government may be used to affect the relationship between federal governments and states (see Quigley and Rubinfeld, 1996).

A substantial literature has been written on the behaviour of sub-central governments following alterations in their grant allocations. However, the vast majority of any empirical studies have been limited to US data, see for example Hines and Thaler (1995), Gamkhar and Oates (1995) and Stine (1994). The few exceptions

include Mangan and Ledward (1997) for the UK, Levaggi and Zanola (2003) for Italy and Moisio (2003) for Finland.

A key observation has been the apparent existence of a 'flypaper' effect. Strictly speaking, the 'flypaper' effect, termed by Arthur Okun, refers to the observation that the expenditure stimulus to local public expenditures from unconditional grants exceeds that generated by increases in private income. That is, money 'sticks where it hits'[17]. However, since then, empirical studies have associated the term 'flypaper' with tests of the extent to which changes in government grants impact on local expenditures without reference to changes in private income (e.g. Gamkhar and Oates (1996) and Oates (1999).

The 'flypaper' effect is a puzzle because increases in grants are in effect equivalent to an exogenous increase in sub-central income. There is no apparent theoretical reason why the vast majority of any increase in exogenous income, stemming from an increase in lump-sum transfers, should necessarily pass through to increases in sub-central public expenditure. Instead, theory would predict that some of these extra resources should either be saved or used to reduce the tax burden on local residents. The elasticity of sub-central public expenditure to income is thought to lie between 0.10 and 0.20. The 'flypaper' effect however, is consistent with a value closer to 1. In the case of the strong 'flypaper' effect (a value equal to 1) any increase in intergovernmental grants is spent entirely on public projects.

[17] Note that a related 'flypaper' effect has been found with respect to firms who seem to spend all the money received from a lawsuit victory immediately.

There have been a number of suggested explanations for the 'flypaper' effect. Most postulate that an error was made, either by the economist studying the problem or by the residents in the jurisdictions receiving the aid. An example of the first type of error is provided in Knight (2000). There it is argued that economists fail to account fully for the institutional framework which links sub-central expenditures and the bargaining process for grants. Knight concludes that one cannot view increases in income from grants as equivalent to increases in private sector income. Instead, grant increases are more often than not, the result of bargaining by sub-central jurisdictions for increased aid to finance higher expenditure. An alternative explanation, which stresses the importance of errors being made by sub-central residents, is that there is some anomaly in the rational behaviour of individuals. One such suggestion by Cournat *et al.* (1979), is that individuals confuse the average and marginal price effects of changes in lump-sum transfers and that a 'fiscal illusion' effect is in place. Such transfers reduce the average cost of local government expenditures, without affecting the marginal cost. However, if voters believe that the marginal cost has been reduced, they may react to unconditional grants by demanding significant increases in government expenditures at this new, perceived to be lower price. A perhaps more sinister view, is given by Filimon *et al.* (1982) who hypothesise that self-interested politicians may prevent voters from obtaining full information on intergovernmental grants, thereby affording bureaucrats etc the luxury of spending any marginal funds transferred from the centre[18].

Hines and Thaler (1995) provide a relatively recent survey of the empirical

[18] Other explanations include omission of important variables such as 'wage discrepancies' (Hamilton, 1983), the behaviour of other governments (see Case et al. 1993) etc.

literature examining the 'flypaper' effect. They conclude that it is widely accepted that a 'flypaper' effect does exist, though it must be stressed that most studies are limited to the US. Having accepted the existence of such an effect, the literature has switched focus to examining the actual magnitude of the 'flypaper' effect. Most studies find strong evidence of a 'flypaper' effect. The following table is taken from Hines and Thaler (1995).

Table 4.2: Examinations of the 'Flypaper' Effect

Paper/Sample	Change in Spending as Grant Changes
Inman (1971): Panel study of 41 city budgets	1.00
Weicher (1972): State aid to 106 municipal governments	0.90
Gramlich and Galper (1973): Federal grants to local and state governments	0.43
Gramlich and Galper (1973): Federal and state aid to 10 large urban governments	0.25
Bowman (1974): Federal education grants to West Virginia to school districts	1.06
Bowman (1974): State grants to West Virginia school districts	0.50
Feldstein (1975): State grants to Massachusetts towns	0.60
Olmsted *et al.* (1993): Missouri state aid to local school districts	0.58
Case *et al.* (1993): Federal grants to 48 states, 1970-1985	0.65

The majority of these studies however, assume that the response of sub-central governments to cuts in grants is the reverse of that observed during grant increases. An interesting, but less developed question, is whether or not the effect of grant changes is symmetrical. Gramlich (1987) argues that asymmetries could be in place, with expenditures matching any increase in grants but being cut by smaller amounts when grants fall back. Gramlich argues that following an increase in grants and expenditure a clientele of those who benefit from the grant is developed. After the

grant is eliminated, the clientele starts to lobby sustaining their welfare through increases in local taxes. Thus, due to political reasons local expenditures may be insensitive to decreases but sensitive to increases in grants.

The evidence for asymmetric responses is mixed. Gramlich (1987) finds evidence of fiscal replacement so that during periods of grant tightening, sub-central governments responded by increasing their own taxation so as to maintain current programs. Thus, he observes an asymmetric response to intergovernmental grants: while sub-central spending is highly sensitive to increases in grants, it is relatively insensitive to the loss of grants. In contrast, Stine (1994) finds evidence of a 'super-flypaper' effect with a difference being observed not only in magnitude but also in size. He shows that for his sample, not only did expenditures decline in response to reductions in grants, *but own-revenues did as well*. Thus in contrast to the study by Gramlich, Stine finds a negative replacement of lost funds, suggesting that central tightening induces sub-central tightening. Gamkhar and Oates (1995) however, find a symmetric response; expenditures move in equal magnitudes in response to cuts and increases in grants.

In our event study by focussing upon cuts in grants we can contribute to this literature by examining the behaviour of sub-central governments during episodes of intergovernmental grant changes. In doing so, we are able for example, to examine whether 'own-source' revenues rise or not and on which elements of expenditure any relative burden of adjustment falls upon.

4.4.2 Estimation Issues

One issue is whether there is some non-linear effect present which cannot be captured by focusing on all real cuts in grants. For instance, it might be possible, given a certain degree of fiscal autonomy for a sub-central government to react to a small cut in grants by raising taxation, whilst a large cut could not be accommodated in this way and might require a significant cutback in spending. In order to check whether the results are affected by the size of the grant cut we divided our sample as shown in equation 4.6. We ranked our sample of 86 observations by size and then divided them into two equal sub-samples of 'large cuts' and 'small cuts'[19]. The largest cuts averaged 2.77% of total sub-central government revenues, whilst the smallest cuts averaged 0.59% of total revenues. Note that both of these categories of cuts are generally sustained. On average, the grants in period T+1 increased by only 0.1% of total revenues for the large grants cut, and by 0.27% for small cuts. In other words, large cuts are substantial and hardly reversed in the following period, whilst small cuts on average tend to be partially, but not wholly, reversed.

Another key issue is potential endogeneity and the causal link implied by the event study. In this study we interpret cuts in grants by central government as

[19] An alternative to dividing grant cuts into different categories is to take account of non-linearities by scaling the effects of events by the magnitude of the events. Thus, one could run a regression of the form:

$$y_{it} = \beta_0 + \left(\beta_1 D_{i,T-2} + \ldots\ldots \beta_5 D_{i,T+2}\right)\Psi_{i,T} + \eta_{it}$$

where Ψ_{it} is the size of the impulse of the grant change. We have experimented with this approach, and so far have found that the predicted path for the fiscal variables around the mean impulse and the average size of a 'large' or 'small' cut in grant is similar to that using our methodology. Clearly, however, the standard error bands will be different, and it is difficult to provide a graphical analysis of this non-linear regression. We leave this to further extensions of our work, but note that it does not, at least at a first pass, suggest very different conclusions in terms of a reaction of sub-central governments to cuts in grants around the mean value. We are grateful to our discussant at the NBER/CESifo Tapes Fiscal Federalism Conference, Dennis Epple, for suggesting this potential extension.

exogenous and as causing reactions by sub-central governments. But what if central grants were to adjust to shifts in expenditure or taxation decisions by sub-central governments?[20] Gamkhar and Oates (1996) take account of potential endogeneity by estimating instrumenting regressions for the cuts in grants. Clearly IV regressions are not appropriate to event study regressions as the potentially endogenous variable, the cuts in grants, do not actually enter the regression. The question is instead whether one should take account of potential endogeneity by estimating instrumenting regressions for the cuts in grants and using predicted rather than actual episodes of cuts in grants, and whether this will lead to very different event study regressions. To check whether this was a problem we estimated some instrumenting regressions for cuts in grants and found very little change in the way sub-central fiscal variables react to predicted as opposed to actual cuts in grants[21]. In any event, even if one does not accept a strong causal link for all the cuts in grants events identified, the event study can still be seen as uncovering empirical regularities "stylised facts" that in some cases are picking up causal effects.

4.4.3 Results

As before, we plot the results from the event study regressions to show how the fiscal variables for the sub-central governments behave in proximity of the cuts in

[20] For instance, excessive sub-central expenditures or reductions in sub-central taxation by might lead to increases in intergovernmental grants.

[21] To be precise, our instrumenting regressions regressed cuts in grants on some political variables (political party in power, type of government using the data from Budge *et al.* , 2000) as well as some conditioning economic variables (lagged unemployment, output). We then used these regressions to identify predicted cuts in grants episodes, and used these to re-run the event study regressions. The signs, sizes and standard errors of the time dummies were very similar and hence accounting for endogeneity would not seem to produce very different results.

grants event. These are shown in Figure 4.2, panels A-G. In each row of the panels in Figure 4.2 we again plot both the annual change and the cumulative change in each fiscal variable. Panels A-G show the reaction of each of the seven fiscal variables to the cuts in grants during the event window, and for each variables the results are divided into all cuts in grants, small cuts in grants, and large cuts in grants. Unlike our research of fiscal consolidations, we find that for the cuts in grants regressions the T-2 dummies are always insignificant, and hence they have been dropped from our regressions.

A number of points emerge from Figure 4.2. First, it is apparent from panel A that there is a sustained cut in total expenditures at sub-central level, and there is even evidence that some of these cuts are anticipated as the T-1 dummy variable is significant. This might be the result of planned or signalled cuts by central governments. Second, as is apparent from panel B, sub-central governments do tend to react significantly in period T to a cut in grants, by raising taxation. Notice that, unlike the fiscal consolidation study, the estimated increase in sub-central tax revenue is significant at time T for all grant cut episodes. The response of sub-central taxation revenues tends to be immediate for large cuts in grants, and delayed (at T+1) for small cuts, although the cumulative change is more sustained in response to small grant cuts. This is a richer picture than emerged from our fiscal consolidation study, where there seemed to be little impact on revenues: although the cumulative effect here is not significant by T+2, there does appear to be a shift towards sub-central taxation as a result of cuts in grants, with a delayed effect in the case of small cuts in grants. However, the impact is less than that on expenditures, and in general this supports the notion that the 'flypaper' effect operates in both directions, in that local governments

choose not to fund certain expenditures if they have to provide funds from their own taxes. This is generally supportive of the results in Gamkhar and Oates (1996), and in contrast to Gramlich (1987). Similarly, there is little evidence that non-taxation revenues from fees and user charges are used to offset the cuts in grants (panel C). Third, the impact of cuts in grants on the sub-central government wage bill is significant at time T for all cuts, and there is a significant (though small) reduction in social transfers and purchases of goods and services (see panels D-F). In the case of the wage bill, the cut in this following a large cut in grants is large and significant at time T and T+1, but is very different in the case of small cuts, where the response of the wage bill is barely significant at time T and never significantly below the starting point, even at T+2. This might be due to the fact that large cuts elicit major adjustments in sub-central governments such as adjustments in the wage bill of local governments. Clearly in the case of social transfers any effect is small because the majority of social welfare expenditures are likely to be the responsibility of central governments for most of the countries in our sample, and this is similar across size of grant cut. Overall the major impact of the cuts in grants appears to fall on the wage bill of sub-central governments, and this ties in with the evidence presented in Chapter 3 which suggested that sub-central governments play an important part in stabilisations. Fourth, as in the case of fiscal consolidations, cutting capital spending by sub-central governments is a standard reaction. Panel G shows clearly that cuts in capital spending constitute a large proportion of the overall adjustment, and that indeed the T-1 dummy is significant, so that some cuts are brought forward ahead of the cuts in grant. Overall the graph shows a substantial tightening across the event window, and this is made even more significant by the fact that capital expenditures tend to be only a small proportion of total expenditures at the sub-central level – see

Chapter 1. Small grant cuts account for more significant and sustained changes in capital expenditure than large grant cuts, as in the latter case the cut in spending appears temporary.

4.4.4 Dependence on Central Government Grants

One question which arises in analysing these responses to central government grant cuts is whether there is a significant difference in the responses of sub-central governments which are highly dependent on grants and those who depend on grants to a lesser extent. In Table 4.3 we have divided the sample into a small group of five countries (the UK, Spain[22] (post-1985), Belgium, Ireland and The Netherlands) which exhibit a high degree of dependence on central grants (above 50%) and those where the dependence is less (below 50%).

[22] Given Spain underwent major reforms in the financing of sub-central governments in the 1980s, we have divided the observations for Spain into two groups, those relating to the pre-1985 reforms period, where Spanish sub-central governments depended less on central grants, and the post-1985 period where intergovernmental grants were more prevalent.

Table 4.3: Ranking by Dependence of Grants: (Grants as % of Total Sub-Central Revenues)	
	Countries with Low Grant Dependence
Spain (pre-1985)	18.56
Sweden	21.59
Germany	23.25
Canada	26.00
Austria	26.11
USA	29.53
Finland	32.19
France	37.14
Norway	37.41
Australia	44.82
Denmark	45.64
	Countries with High Grant Dependence
UK	55.74
Spain (post-1985)	56.42
Belgium	57.87
Ireland	69.77
Netherlands	77.41

Figure 4.3 shows the annual change in the fiscal variables following a cut in central grants, in each of panels A-G. What is striking about these results is that those countries that are least dependent on central grants seem to cut expenditure more (i.e. there is a stronger reverse 'flypaper' effect). From the results in Figure 4.3, panel B, it appears that fiscal autonomy[23] does not necessarily imply a willingness to offset grant cuts through increases in taxes. Similarly, those countries that are less dependent on grants are more responsive in cutting all the components of spending (goods and services, social transfers, wages, and capital expenditure).

[23] Although one has to recall that many of those who are less dependent on grants do benefit from tax-sharing arrangements.

This result does suggest that cuts in grants elicit different reactions in different institutional settings, although it is interesting to note that those countries that are least dependent on central government grants are more likely to adjust. To check the robustness of this result, we conducted some further analysis to check which countries and what institutional features were driving this result.

4.4.5 Fiscal autonomy and Reaction to Grant Cuts

One way to examine how individual countries react during the events is by introducing interactive dummies in our event study regressions (see equation 4.3). These show whether individual countries display a behaviour which is significantly different from that of other countries in terms of the coefficient on the time dummies in the regression. To put this another way, it shows whether for individual countries the profile of the fiscal variables evolves in a significantly higher or lower path. In general, these results were not very informative, and for some countries (Spain and Finland) there were too few observations to allow us to introduce country dummies[24]. Some consistent results do emerge: for instance, Belgium shows a lesser cut in expenditure relative to the reference value, Canada and the US display a smaller increase in taxation, and Austria and France showed a larger increase in taxation and higher expenditure, following cuts in grants episodes. Germany and France also displayed a significantly larger cuts in capital spending, but Austria displayed significantly smaller cuts, following cuts in grants. In the UK sub-central governments seem to anticipate cuts in grants with bigger cuts in expenditure at T-1.

[24] These results are not tabulated for reasons of space. However, the results are available on demand.

In order to obtain more informative results, which use up less degrees of freedom, we tried grouping the countries into different categories, depending on the institutional features of their fiscal arrangements.

Table 4.4 shows the ranking of the countries in our samples by expenditure decentralisation. A greater degree of decentralisation in spending should presumably allow sub-central governments greater scope to adjust to a cut in grants.

Table 4.4: Ranking by Expenditure Decentralisation: (Sub-Central Expenditure as % of Total Government Expenditure)

	Least Decentralised Countries
Belgium	11.82
Spain (pre-1985)	15.74
France	16.93
Netherlands	24.99
Ireland	25.27
UK	25.37
Spain (post-1985)	27.83
Austria	30.73
	Most Decentralised Countries
Norway	33.63
Sweden	36.19
Finland	38.86
Australia	41.43
Germany	41.77
USA	44.51
Denmark	45.01
Canada	57.34

The first row of Table 4.5 shows that this does seem to be the case, with taxation, total expenditures, and expenditures on goods and services lower than the reference value[25].

Table 4.5 Summary of Results Using Country Groupings	
Criteria used for Grouping Countries	Significant NEGATIVE Effects
Highest Expenditure Decentralisation	Total Expenditure Expenditure on Goods and Services Taxation Revenue
Highest Tax Autonomy	Total Expenditure Taxation Revenue
Highest Borrowing Autonomy	Total Expenditure Capital Expenditure

We next attempted to see whether by grouping the countries by the degree of taxation autonomy this might explain some of the reactions to the cuts in grants. In order to do this, we use the measures of taxation autonomy published in OECD (1999) and Rodden (2002)[26]. We group our countries according to either High or Low levels of Taxation Autonomy – see Table 4.6.

[25] In tabulating these effects we focus on the interactive dummies at time T. In some cases, we found that the interactive dummies were significant in other time periods. However these effects are difficult to explain in terms of institutional features in the country groupings, and seem to be less important.
[26] For a discussion of this information see Chapter 1.

Table 4.6: Ranking by Tax Autonomy

	Sub-Central Tax Revenues as % of Total Sub-Central Revenues (A)	% of Sub-Central Taxation for which Sub-Central controls Tax Rate and/or Tax Base (B)	Tax Autonomy: 'Own Taxes' as % of Total Sub-Central Revenues (C) = (A) x (B) /100
			Countries with Greatest Tax Autonomy
Sweden	61.47	100	61.47
Canada	56.41	86	48.51
Finland	49.53	89	44.08
Denmark	43.75	95	41.56
USA	47.46	76	36.07
			Countries with Least Tax Autonomy
Belgium	34.25	97	33.22
Spain	40.71	67	27.28
UK	24.15	100	24.15
Ireland	10.25	100	10.25
Netherlands	7.12	100	7.12
Germany	54.45	13	7.08
Austria	51.21	11	5.63
Norway	45.74	3	1.37
Australia	32.88	N.A.	N.A.
France	43.06	N.A.	N.A.

Sources: Column (A) - IMF Government Financial Statistic (2002), calculated as sample averages.

Column (B) - Estimates for Canada and USA were provided by Jonathan Rodden and are based on control of *both* the tax rate and base, the remaining data are OECD (1999). All figures are for 1995.

The second row of Table 4.5 show that in fact few significant effects could be found at time T, so that tax autonomy does not appear to be a significant feature explaining how sub-central governments react to cuts in grants. It is interesting to know that a higher degree of taxation autonomy still involves a reverse 'flypaper'

effect and that there is no attempt by sub-central governments to offset the consequences of lower grants on sub-central spending.

Finally, we group the countries according to a measure of borrowing autonomy (see Table 4.7).

Table 4.7: Ranking by Borrowing Autonomy	
	Lowest Levels of Sub-Central Borrowing Autonomy
Belgium	1.45
Denmark	1.45
UK	1.5
Austria	1.6
Norway	1.6
Ireland	1.75
	Highest Levels of Sub-Central Borrowing Autonomy
Netherlands	2.3
Germany	2.3
Australia	2.5
Spain	2.6
Canada	2.7
France	3
Finland	3
Sweden	3
USA	3

Source: Rodden (2003) – see Chapter 1.

The final row of Table 4.5 shows that the countries with the greatest borrowing autonomy react to cuts in grants through lower total expenditure and lower capital spending, relative to the reference value. It appears that, even for countries with high levels of autonomy, sub-central expenditures and grants are strategic complements.

4.5. Conclusion

In this Chapter we have re-affirmed our belief in the importance of sub-central governments during national fiscal adjustments. Using comparative data on sub-central government variables and on inter-governmental grants, we have provided a picture of how sub-central tiers of government behave during periods of fiscal consolidation, and how grants play a key role in forcing sub-central governments to adjust. We use event study analysis to examine not only how governments react to these adjustment episodes, but also the time profile of the adjustment.

The results which emerge are varied and are set out in detail in the body of the Chapter. However, it is worth highlighting three general points which emerge from our empirical analysis. The first is that consistent with out findings in Chapter 3, sub-central governments play a key role in successful fiscal consolidations. This provides further support for the argument that understanding sub-central government behaviour is important in overall macroeconomic stabilisation. However, this result is tempered by the observation that fiscal decentralisation does not seem to necessarily imply loss of control, as suggested by some observers (cf Rodden, 2002, Rodden and Wibbels, 2002), or to a higher degree of taxation, provided that the centre retains a degree of control through grants. Sub-central governments do not appear to react to fiscal consolidation attempts by increasing own taxes. Furthermore, the largest cuts in sub-central expenditure in response to a cut in grants from central government seem to have occurred in countries with greater expenditure decentralisation. This implies that, even within countries which have high degrees of decentralisation, grant allocations provide a mechanism whereby central governments retain considerable

effective control over aggregate sub-central expenditures. In Chapter 6 we focus more exclusively on the implications of alternative forms of fiscal decentralisation on the nature and success of consolidation attempts.

The second general theme is that we present some evidence that cuts in grants play an important role in fiscal consolidations. We also demonstrate that cuts in grants are not generally offset by increases in sub-central taxation revenues. Overall, the increase in sub-central taxation following episodes of cuts in grants tend to be weak, and this is generally supportive of the presence of a reverse 'flypaper' effect, but without evidence for an asymmetric 'flypaper' effect as suggested by Gramlich (1987).

The third general point is that capital spending is an important adjustment mechanism for sub-central governments following fiscal consolidations or cuts in grants. Although the nature of the adjustment does depend on the degree of success of the consolidation or the size of the cut in inter-governmental grant, what is striking is that capital spending does tend to suffer at sub-central level following a fiscal adjustment. This is despite the relatively small size of capital expenditure compared to total sub-central budgets, and possibly highlights a degree of short-termism on the part of local governments in adjusting their fiscal position.

4.6 References

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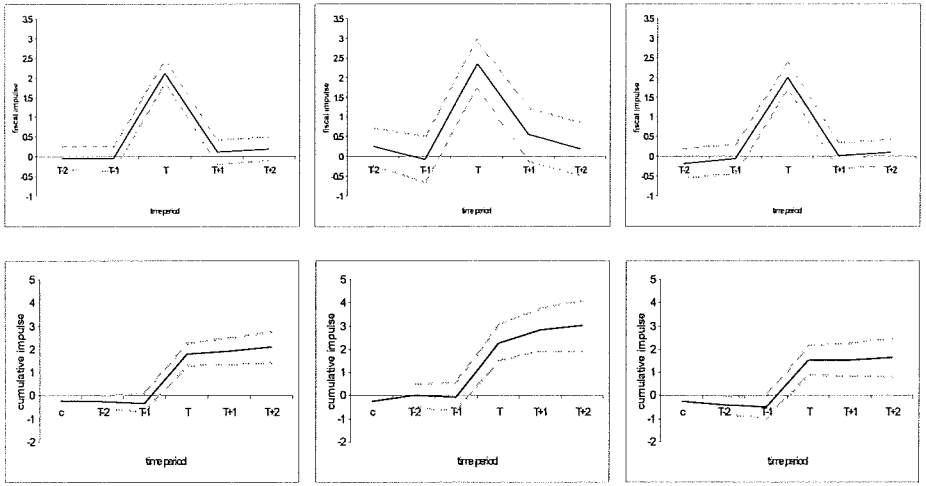
FIGURE 4.1:

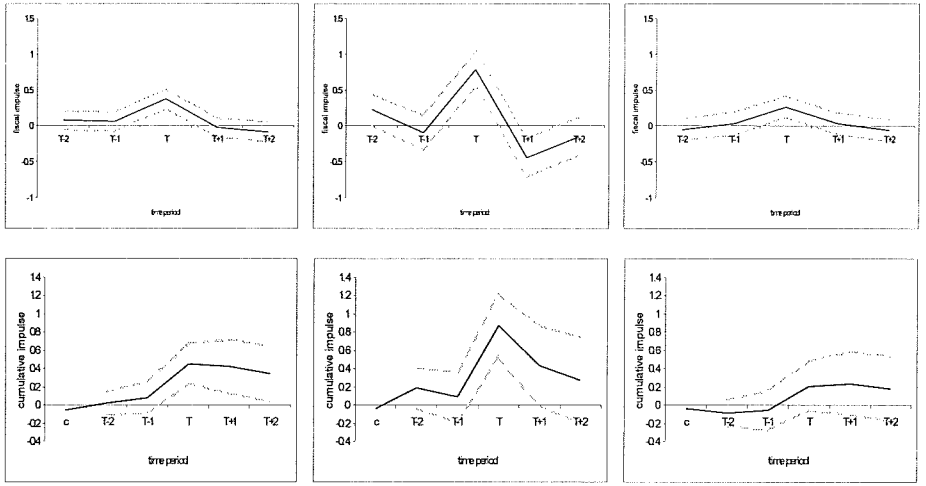
A: Central Government Fiscal Impulse

All | Successful | Unsuccessful



B: Sub-Central Government Fiscal Impulse

All | Successful | Unsuccessful



C: Sub-Central Fiscal Impulse Split by Level of Decentralisation

Most decentralised | Least Decentralised

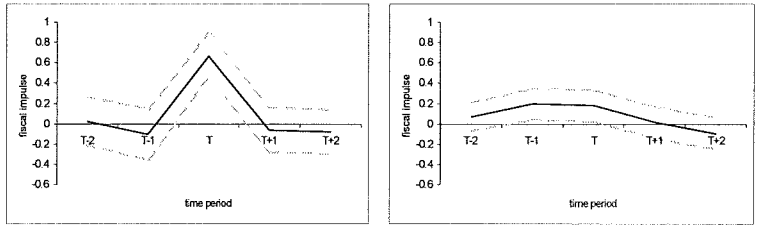
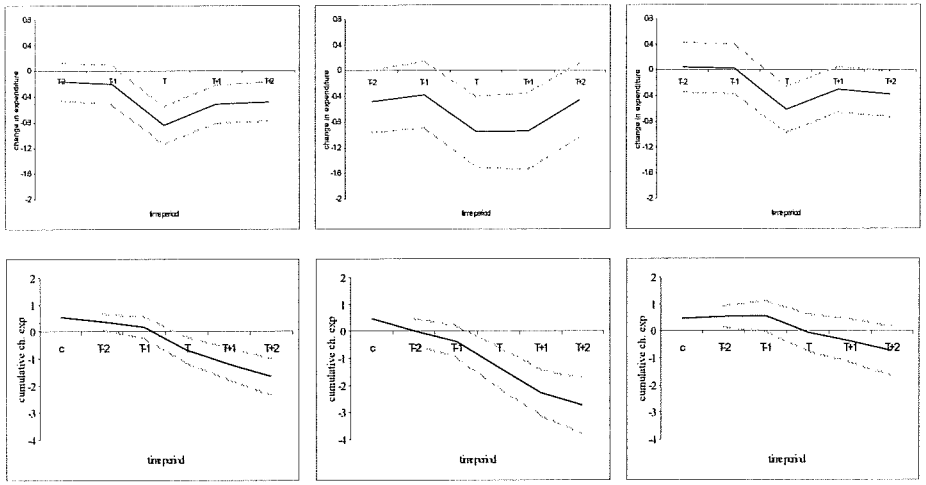


FIGURE 4.1 continued…

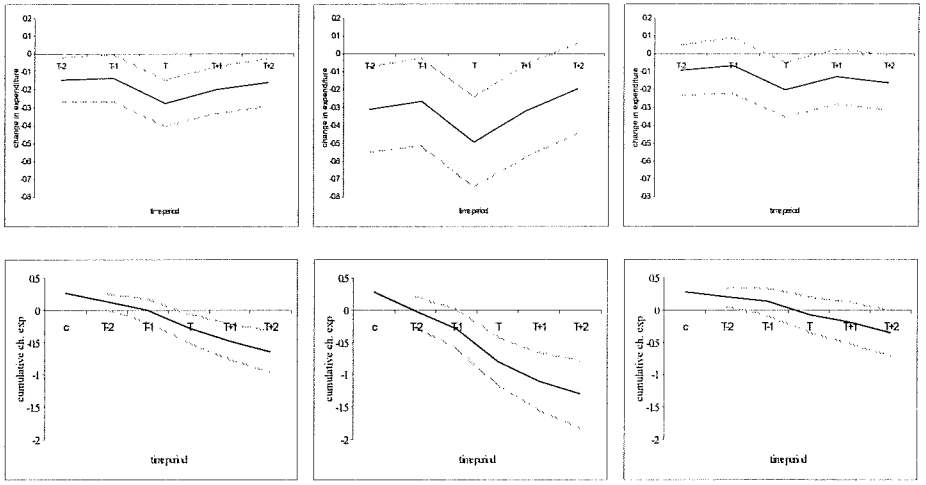
D: Central Government Total Expenditure

All Successful Unsuccessful



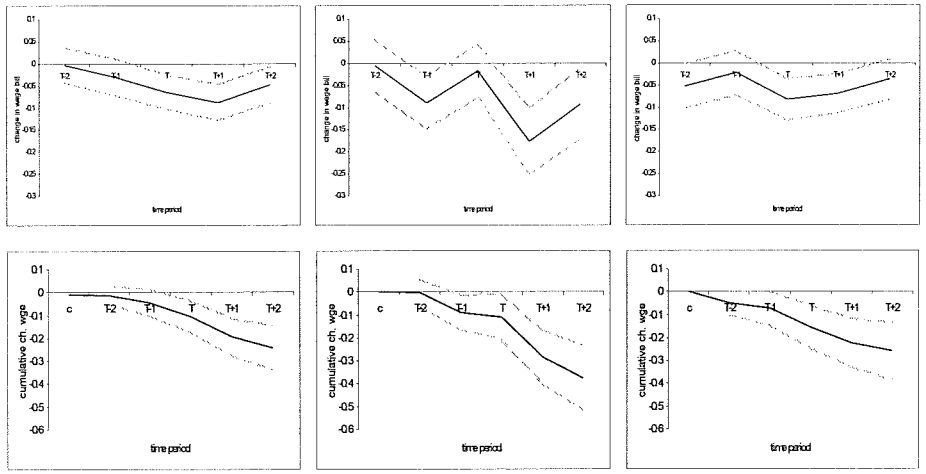
E: Sub-Central Government Total Expenditure

All Successful Unsuccessful



F: Central Government Wage Bill

All Successful Unsuccessful



G: Sub-Central Government Wage Bill

All Successful Unsuccessful

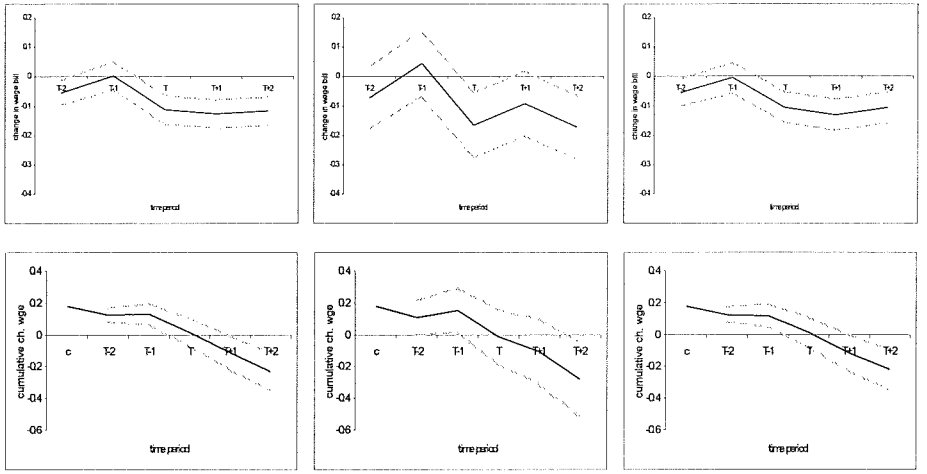
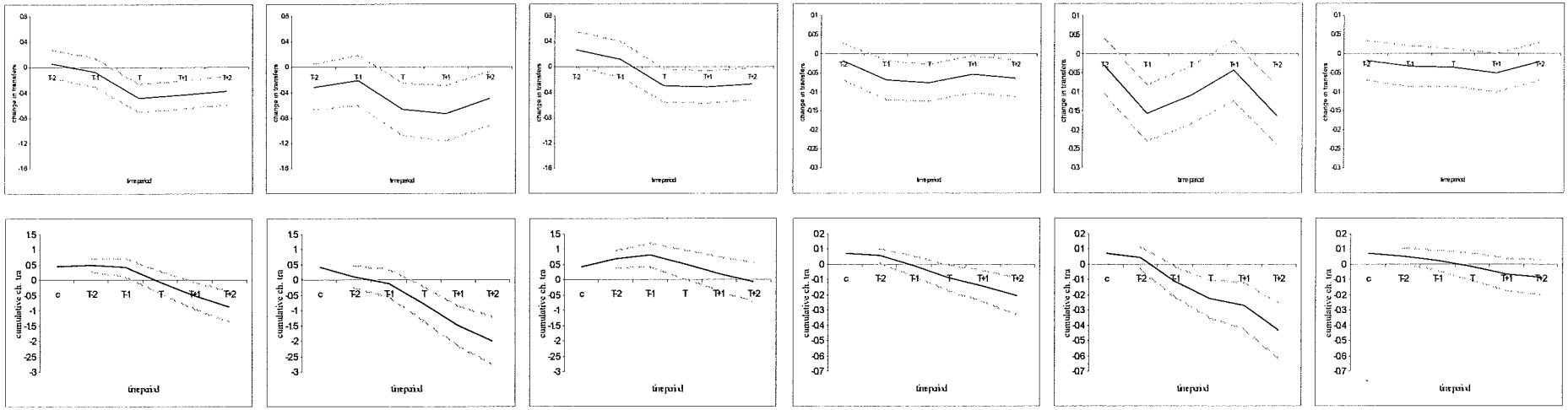


FIGURE 4.1 continued…

H: Central Government Social Transfers

All | Successful | Unsuccessful

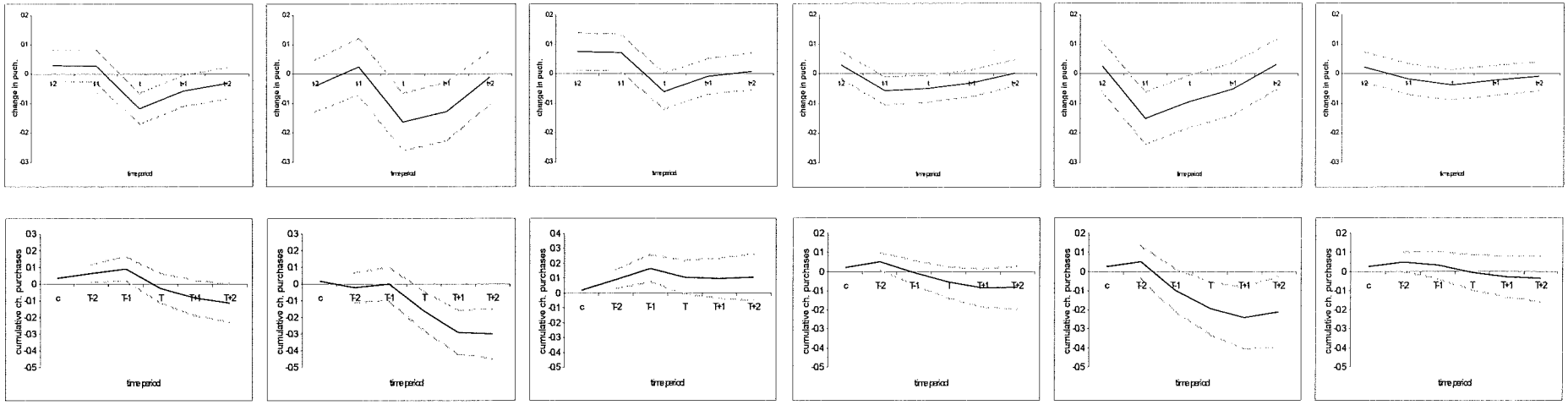


I: Sub-Central Government Social Transfers

All | Successful | Unsuccessful

J: Central Government Expenditure on Goods and Services

All | Successful | Unsuccessful



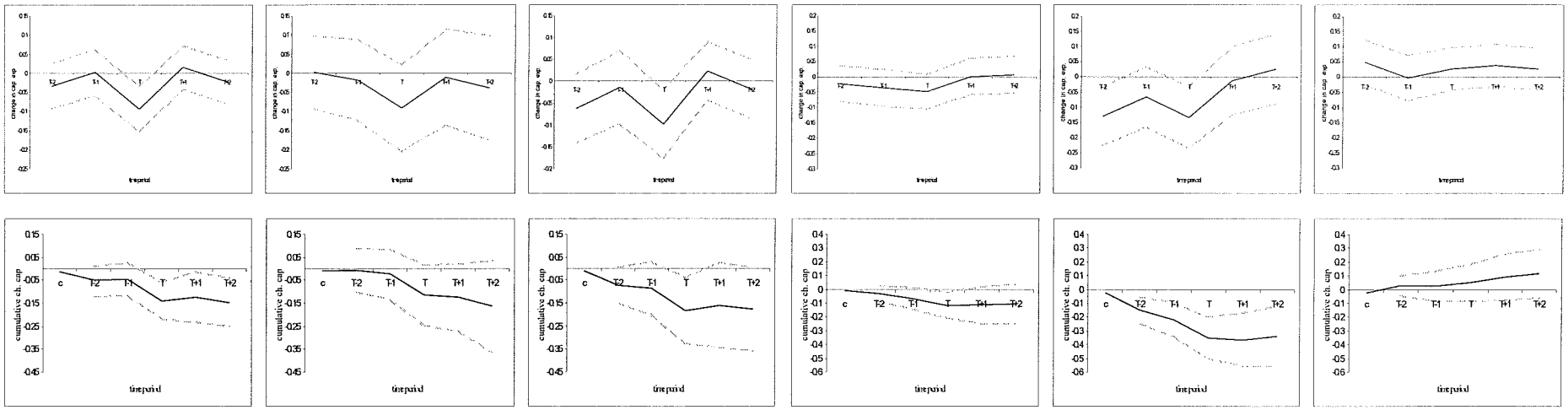
K: Sub-Central Government Expenditure on Goods and Services

All | Successful | Unsuccessful

FIGURE 4.1 continued…

L: Central Government Capital Expenditure

All | Successful | Unsuccessful

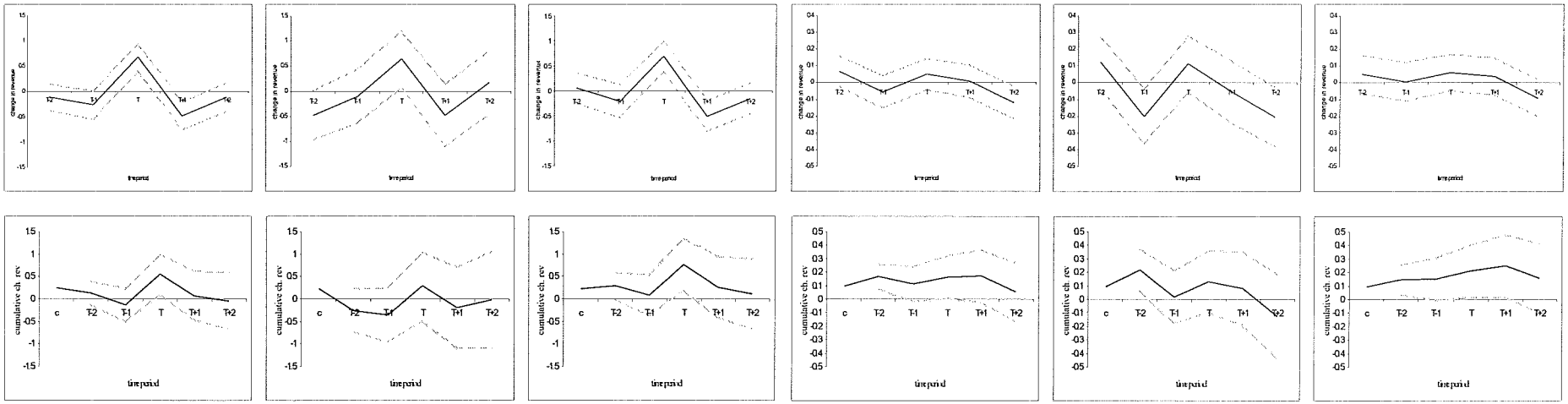


M: Sub-Central Government Capital Expenditure

All | Successful | Unsuccessful

N: Central Government Total Revenue

All | Successful | Unsuccessful



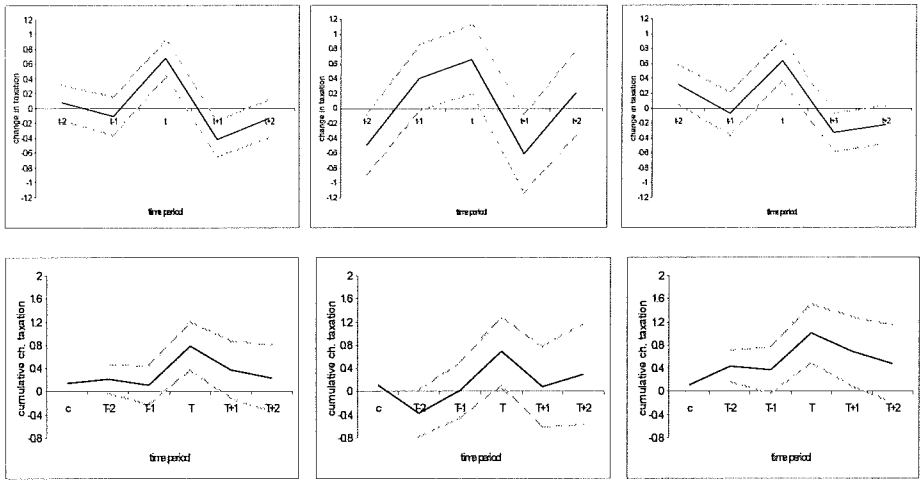
O: Sub-Central Government Total Revenue

All | Successful | Unsuccessful

FIGURE 4.1 continued…

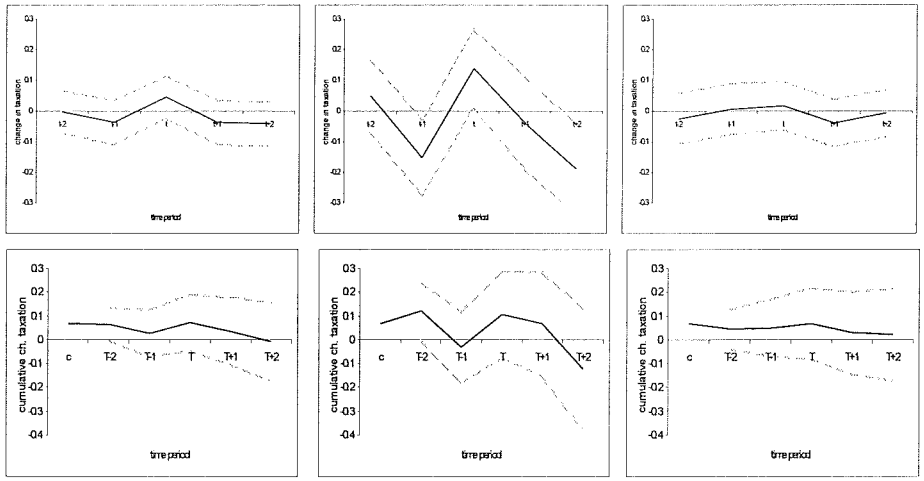
P: Central Government Taxation Revenues

All | Successful | Unsuccessful



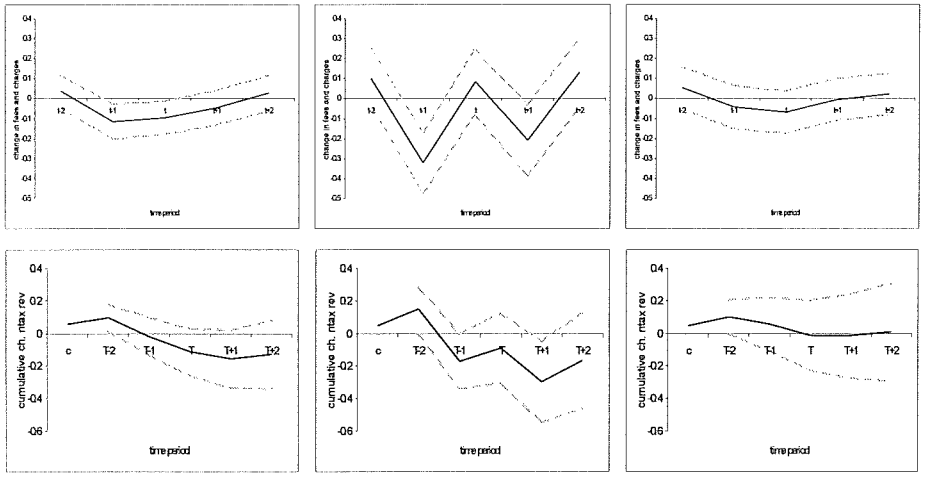
Q: Sub-Central Government Taxation Revenues

All | Successful | Unsuccessful



R: Central Government Non-Tax Revenues

All | Successful | Unsuccessful



S: Sub-Central Government Non-Tax Revenues

All | Successful | Unsuccessful

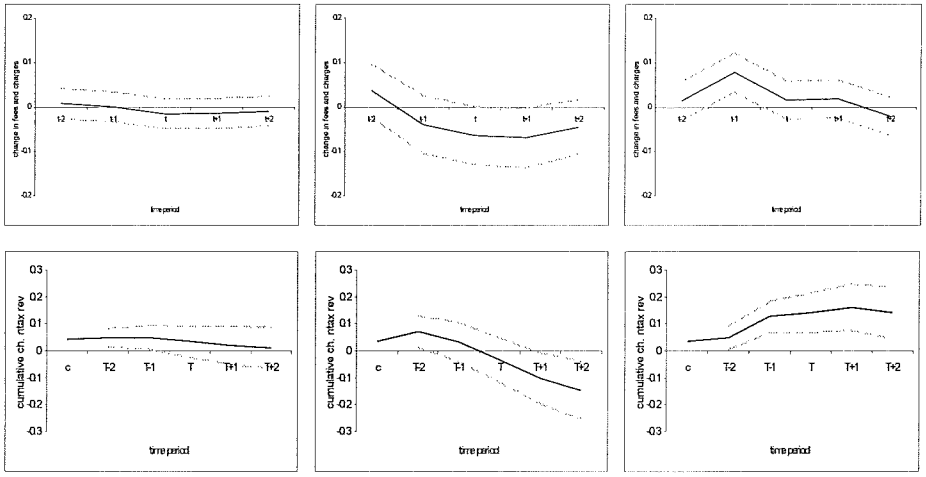
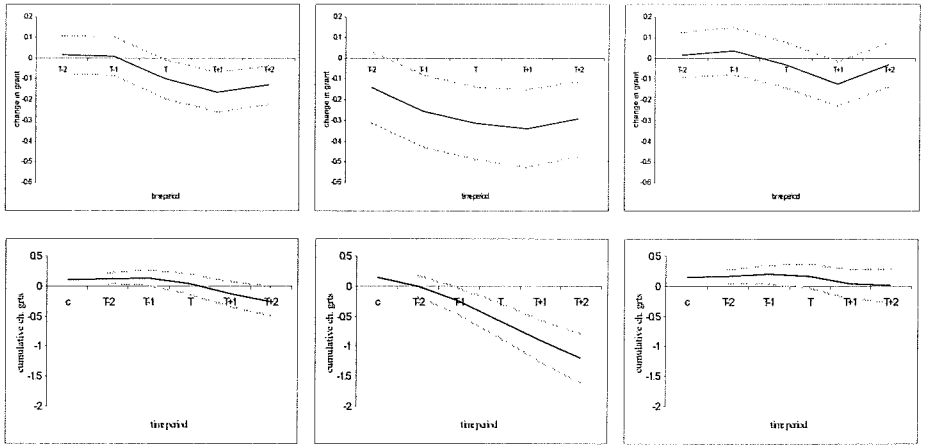


FIGURE 4.1 continued…

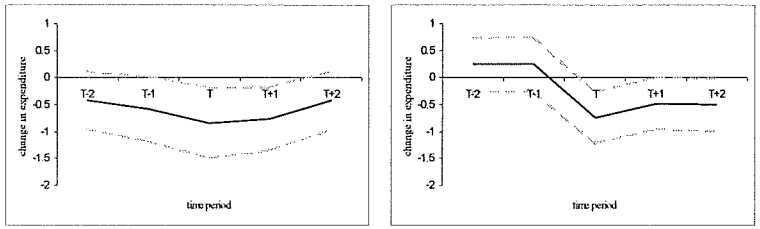
T: Sub-Central Government Grants

All | Successful | Unsuccessful



U: Central Government Total Expenditure

Single Party Central Government | Central Government Coalition



V: Sub-Central Government Grants

Single Party Central Government | Central Government Coalition

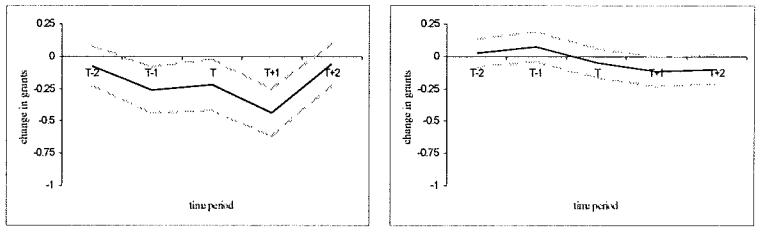
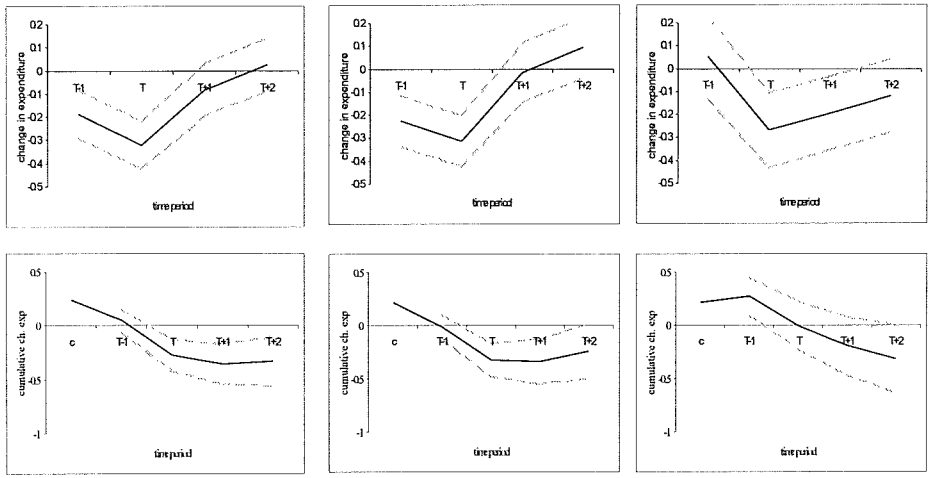


FIGURE 4.2

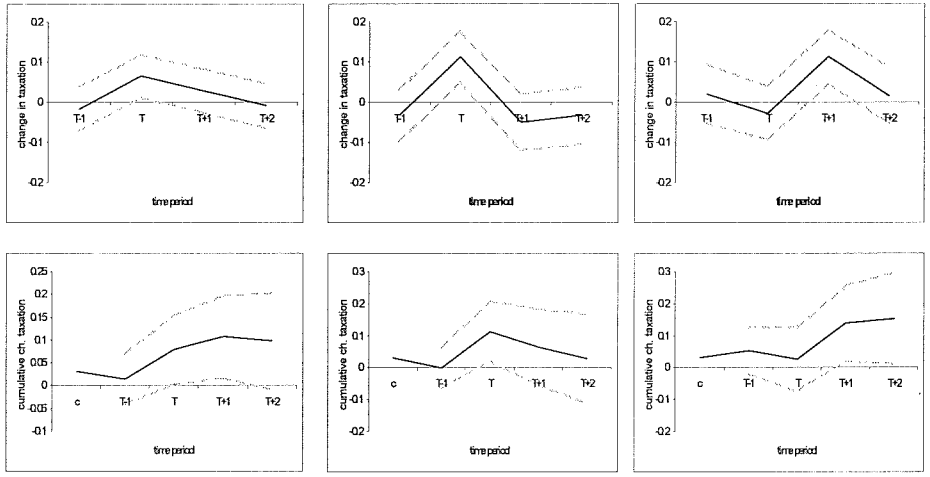
A: Sub-Central Total Expenditure

All | Large Cuts in Grants | Small Cuts in Grants



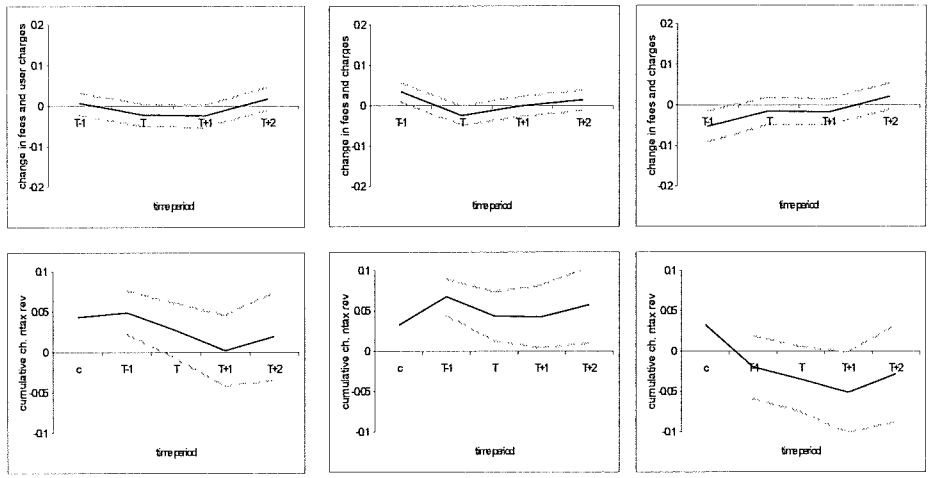
B: Sub-Central Taxation Revenue

All | Large Cuts in Grants | Small Cuts in Grants



C: Sub-Central Non-Tax Revenue

All | Large Cuts in Grants | Small Cuts in Grants



D: Sub-Central Wage Bill

All | Large Cuts in Grants | Small Cuts in Grants

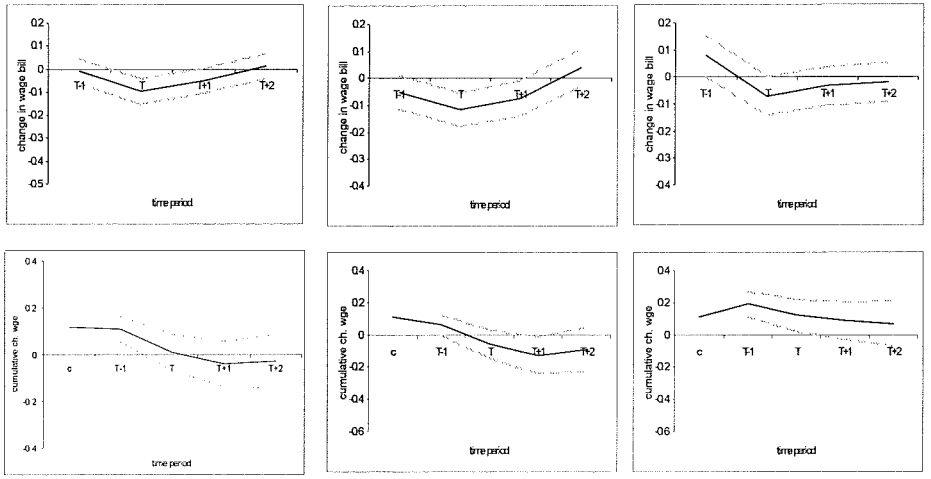
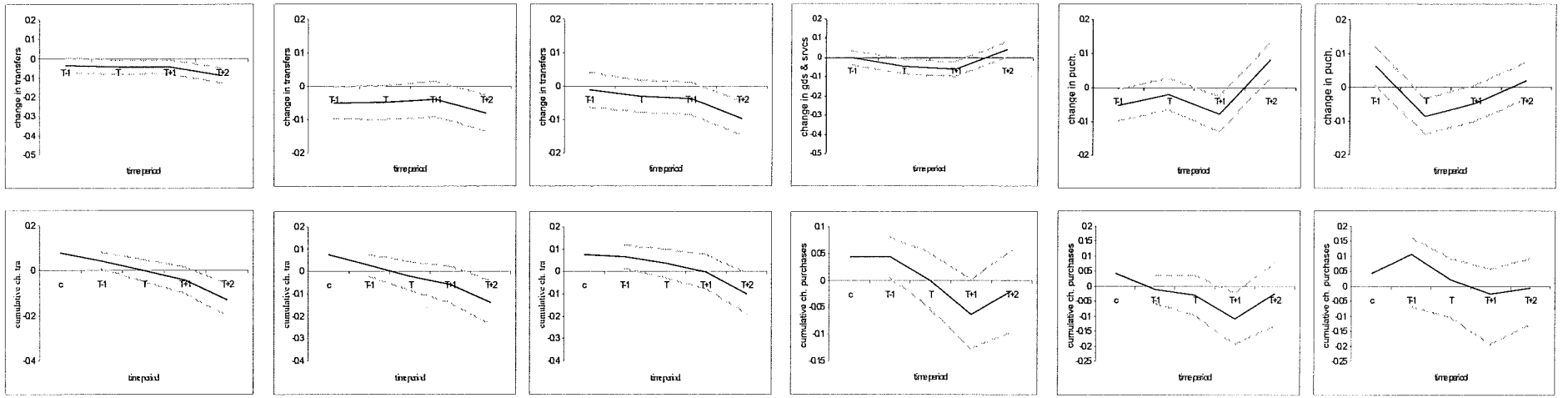


FIGURE 4.2 continued:

E: Sub-Central Social Transfers

All | Large Cuts in Grants | Small Cuts in Grants



F: Sub-Central Expenditure on Goods and Services

All | Large Cuts in Grants | Small Cuts in Grants

G: Sub-Central Capital Expenditure

All | Large Cuts in Grants | Small Cuts in Grants

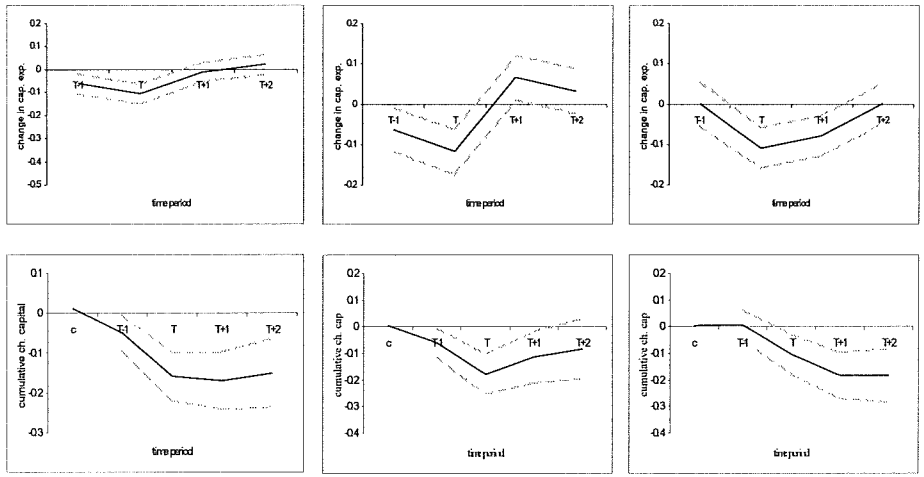
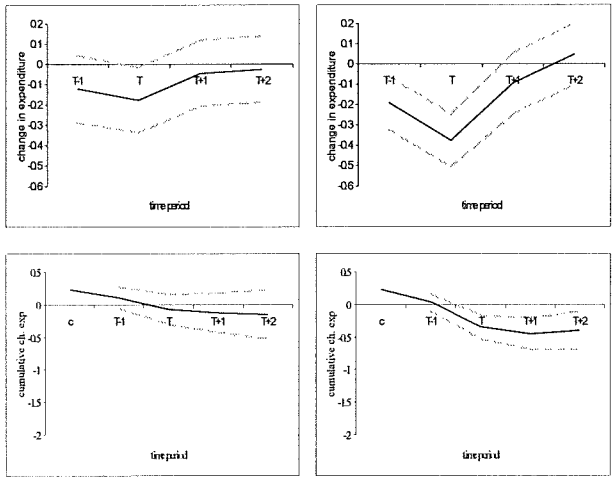


FIGURE 4.3

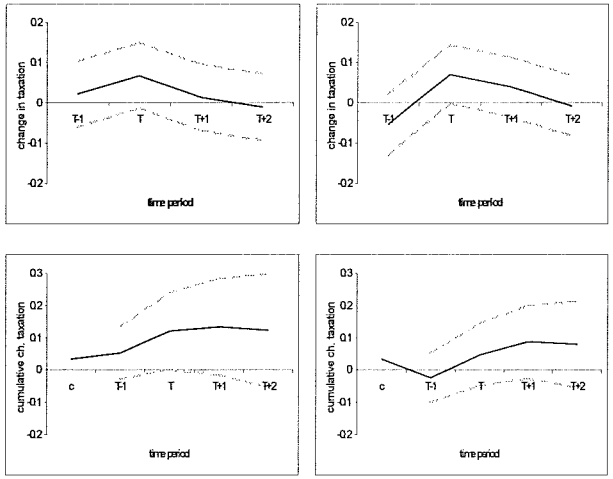
A: Sub-Central Total Expenditure

High Grant Dependence | Low Grant Dependence



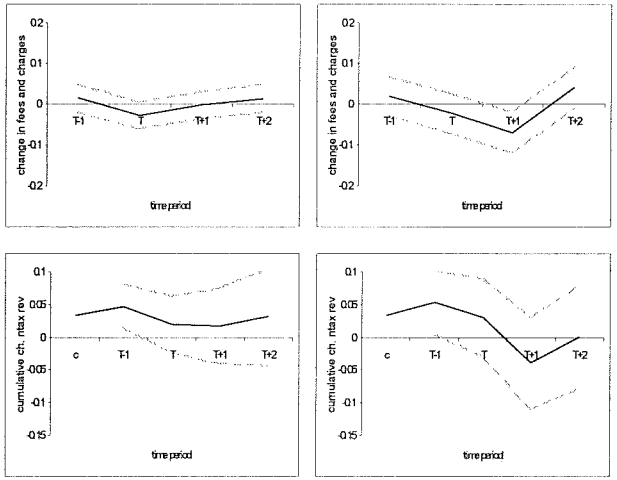
B: Sub-Central Taxation Revenue

High Grant Dependence | Low Grant Dependence



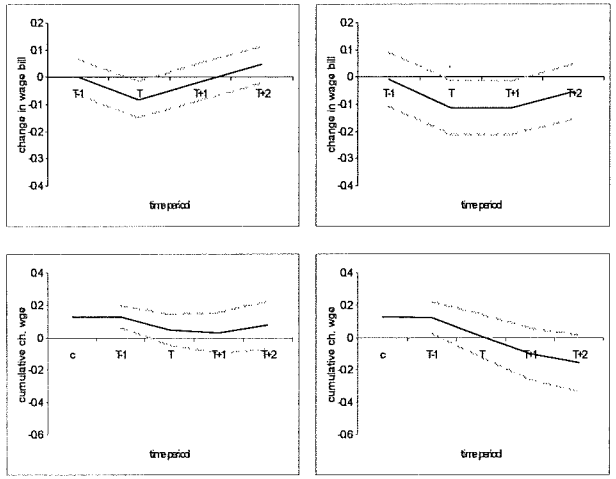
C: Sub-Central Non-Tax Revenues

High Grant Dependence | Low Grant Dependence



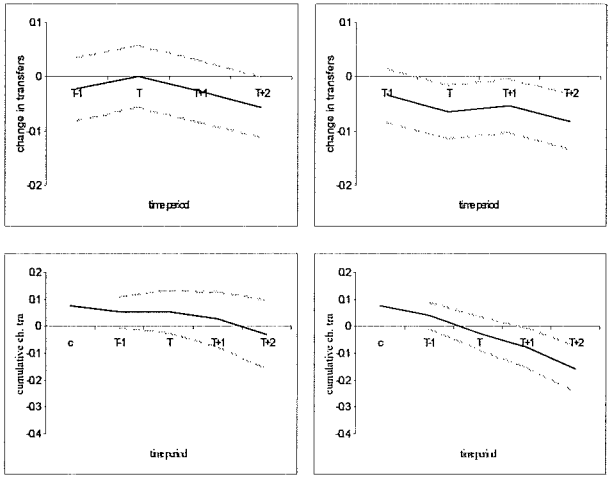
D: Sub-Central Wage Bill

High Grant Dependence | Low Grant Dependence



E: Sub-Central Social Transfers

High Grant Dependence | Low Grant Dependence



F: Sub-Central Expenditure on Gds & Svs

High Grant Dependence | Low Grant Dependence

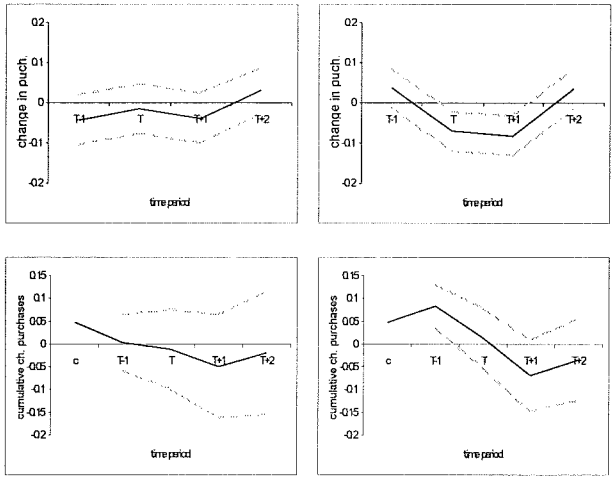
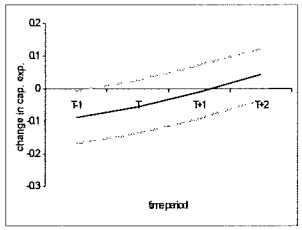
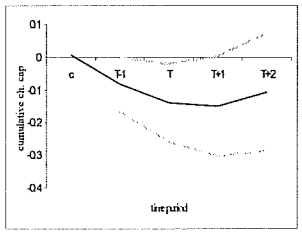


FIGURE 4.3 continued:

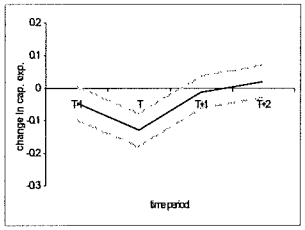
G: Sub-Central Capital Expenditure

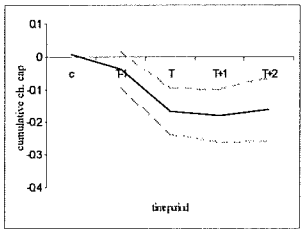
High Grant Dependence





Low Grant Dependence





CHAPTER 5

"Assessing the Degree of Central Government Effective Control: Grants versus Tax sharing[1]"

5.1. Introduction

Obtaining an accurate measure of the level of central (i.e. vertical) control over sub-central fiscal policy is an important pre-requisite for any empirical study of fiscal decentralisation. As outlined in Chapter 1, there exist substantial differences in the sub-central financing regimes adopted by industrial countries. In some, sub-central tiers rely heavily upon inter-governmental transfers and hence the degree of central control is relatively high, while in others, sub-central tiers have far greater revenue raising responsibility. As discussed in Darby *et al.* (2002), substantial central control, by reducing the effective autonomy of sub-central governments, can serve to weaken sub-central accountability and legitimacy. On the other hand, more limited control has the potential to lead to policy conflict between tiers, especially during periods of instability or reform such as during a national consolidation attempt[2]. In this chapter we discuss the implications of alternative sub-central financial regimes on the effectiveness of central governments to control sub-central fiscal policy and hence freely dictate not only central but also national fiscal policy. To do this, we construct a simple stylised budgetary accounting framework from which we are able to compare

[1] We are grateful to participants at the Scottish Graduate Programme 2004 Conference and the Royal Economic Society 2004 Easter School for comments on an earlier version of this paper.

and contrast the policy options available to the central government to control sub-central fiscal policy during consolidation attempts.

While the degree of central control over national fiscal policy is obvious in a fully centralised system, in decentralised systems we show that the degree of 'effective' central control depends critically on how sub-central expenditures are financed.

In the past, researchers typically measured sub-central autonomy and by implication the degree of central effective control over national fiscal policy, as the ratio of sub-central expenditure relative to national expenditure (see Oates (1999) for a survey of this literature). However, while this method remains popular, it fails to acknowledge the revenue source which finances these expenditures. If the central government finances a large proportion of such expenditures via vertical inter-governmental transfers the centre can retain a substantial degree of 'effective' control over expenditure. By altering the revenue source financing certain expenditures, the centre is able in many cases to 'force the hand' of the sub-centre to make cuts even if they are unwilling to do so. For example, in Chapters 3 and 4 we found strong evidence of a reversed 'flypaper' effect. Therefore, for a given level of sub-central expenditure, the degree of effective central government control over the sub-centre, and hence by implication over national fiscal policy, depends critically upon whether or not such expenditures are financed by own-source sub-central revenues or by central grants/tax sharing arrangements and so forth.

[2] For a discussion of the sources of such policy conflicts see Chapter 6.

Stein (1999) was the first to fully acknowledge the importance of accounting for central to sub-central grants in any cross-country empirical examination of fiscal decentralisation. However, Rodden (2002), Pola (1999) and Ebel and Yilmaz (2002) have argued that relying upon grants as the sole measure of central government control may itself be inaccurate. As discussed above, datasets such as the GFS make no distinction between sub-central tax revenues that are 'own-source' and those that are raised from vertical tax sharing arrangements. As evident from OECD (1999) under most tax sharing regimes, the central and sub-central shares of the total pool of revenues raised from shared taxes are fixed either by the constitution or by some previously mutually agreed means-tested formula. However, even though the tax 'shares' each tier receives are fixed, the centre does retain full control over the base and the rate of the commonly shared revenue source. Typically, sub-central governments have no authority to alter these revenues, instead they depend entirely upon the policy decisions of the central government to raise a given level of resource and the pre-determined formulas in place to allocate these revenues. Thus, Rodden (2002), Pola (1999) and Ebel and Yilmaz (2002) argue that revenues from tax sharing arrangements should in fact be classified as central to sub-central transfers since like grants, the sub-centre is entirely dependent upon the policy choices of the centre.

In this chapter however, we demonstrate that the degree of central government effective control over sub-central fiscal policy is in fact different under a) tax sharing and b) grant financing regimes. To highlight this, we again focus upon national consolidation attempts. We demonstrate that for a given level of sub-central expenditure, the degree of effective central government control is higher under a

system of grants than under tax sharing. Therefore it follows that, grants and tax sharing should not be viewed as identical tools of central control over the sub-centre.

This conclusion has important implications. While both tax sharing and grants represent a reduction in sub-central financial autonomy relative to full tax autonomy, the degree of effective central control is higher under a system of grants than under tax sharing. Therefore, switching from grant finance to tax sharing, which has been advocated in many countries including Scotland[3] on the grounds of improved incentives for sub-central governments, does contrary to established thinking, represent a substantial loss in central effective control. It is necessary therefore, to be aware of the substantial alteration to the public finance arrangements of a country if such a reform were to take place[4]. This result also has important implications for academic research. It implies that the recent trend in the literature to classify grants and tax sharing arrangements as equivalent sources of intergovernmental transfer is inappropriate. While both involve a transfer of resources, the relative ability of the centre to control these transfers is substantially different. Thus, empirical research while acknowledging the fact that the GFS measure of taxation does not accurately reflect 'own source' taxation should also be wary of classifying the remaining taxation revenues as identical to grants.

The outline of the remainder of this chapter is as follows. In Section 5.2 we introduce and develop our basic accounting framework upon which our discussions are based. In Sections 5.3 through 5.6 we compare and contrast the level of effective

[3] See for example Hallwood and MacDonald (2004).
[4] Equally, moving toward increased grant finance in systems where tax sharing has been popular in the past implies a substantial reduction in sub-central autonomy.

central government control of sub-central expenditures in a variety of alternative decentralisation regimes during national consolidation attempts. We show that while the level of central control in a system of grant finance mirrors that under full centralisation, tax sharing in contrast, is in fact more akin to full decentralisation. Section 5.7 concludes.

5.2. The Basic Framework

In order to highlight the differences in effective central control under alternative decentralisation regimes we construct a simple stylised budgetary accounting framework. While, many of the assumptions are undeniably unrealistic, their use illustrates any important differences between alternative financial regimes. More specifically, our motivation for building such a stylised model is to compare and contrast the level of 'effective' central government control in being able to eliminate a national fiscal deficit. More complex models are possible, however this framework clearly illustrates the issues involved without becoming immersed in discussion over extraneous issues.

We begin by assuming that there are two tiers of government, the centre (C) and the sub-centre (S)[5]. Each tier of government undertakes expenditure (E), denoted CE and SE respectively. We assume that central expenditure (CE) is comprised of two components: non-cyclical (or autonomous) expenditure α and cyclical expenditure

[5] For simplicity we assume that there is only one sub-central government. While in practice there are a number of individual sub-central governments, for this analysis, the actual number is unimportant. Our goal is to demonstrate the level of central control over the sub-central tier as a whole, irrespective of the number of sub-central units.

$\beta(y)$: where y is the deviation in output from the natural rate ($y = Y-Y^*$). Thus, in this simple framework with a zero output gap, cyclical expenditures are zero. For simplicity we assume that the parameter β is fixed and that government expenditures do not impact on output. By implication, the central government only has discretionary control over the non-cyclical component of their expenditures α. Thus CE can be defined as:

$$CE = \alpha + \beta(y) \tag{5.1}$$

$$\text{where, } \frac{\partial CE}{\partial y} = \beta'(y) < 0 \tag{5.2}$$

We assume that while output effects the fiscal balance, changes in fiscal policy have no immediate impact on output. The inclusion of output in this way is simply to generate a negative fiscal position that requires action. We could for example let fiscal policy affect output but in a way in which would retain a negative fiscal balance or we could simply assume that the central fiscal position is negative at the outset and adjustment is necessary, perhaps to meet EMU criteria.

In contrast, and without loss of generality, we assume that sub-central expenditure (SE) is not influenced by the economic cycle. Both SE and CE represent current expenditures; there are no capital investments.

The centre raises revenue through taxation CT, which can also be broken into non and cyclical taxation components - δ and $\varphi(y)$ respectively[6]. Thus CT can be defined as

$$CT = \delta + \varphi(y) \tag{5.3}$$

$$\text{where, } \frac{\partial CT}{\partial y} = \varphi'(y) > 0 \tag{5.4}$$

In contrast, the sub-centre raises their revenue (SR) either through own-source non-cyclical taxation (ST) or via inter-governmental transfers. The latter can either be in the form of grants (SG) or via revenues from tax sharing (ST_{share}) arrangements. For simplicity, we assume that under each scenario (e.g. grants, full decentralisation etc) all sub-central revenues (SR) are raised from a particular single source, e.g. autonomous taxation, grants etc.

To complete the budgetary framework we assume that no government can issue debt. Given the assumption of zero capital goods and the lack of a dynamic framework, this translates itself into a simple balanced national/general budget requirement. However, a 'fiscal deficit' within a particular tier of government can be financed by a parallel surplus at the other tier. Thus for example, sub-central governments could run a deficit provided that their excess expenditures were fully financed by a surplus at the centre or vice versa[7].

[6] As before, we assume that y is the deviation in national income from the natural rate ($y = Y-Y^*$) and that the parameter φ is fixed.

[7] In such a scenario, the resources from the central government's fiscal surplus can be transferred to the sub-centre. Without this 'additional' transfer, sub-central expenditures (revenues) would have to be cut (increased) to balance their budget.

We assume that the centre has a pre-determined 'optimal' level of both autonomous expenditure and revenue denoted $\overline{\alpha}$ and $\overline{\delta}$ respectively. They have a similar pre-determined 'optimal' level of sub-central expenditure ($S\overline{E}$) and revenue ($S\overline{R}$). Given that central governments are accountable to the national electorate and are the ultimate guarantors of macroeconomic stability, it is likely that they will have an optimal sub-central policy stance they would like as an implementation preference (even if this is inconsistent with the sub-centre's preferences). In the UK for example, much of the local government reforms over the last two decades have been in response to policies being pursued by local governments which were inconsistent with those of the centre. These reforms have been clearly designed to give the Westminster government greater control thereby reducing such conflict over policy[8].

In contrast, the sub-central tier is also assumed to have an 'optimal' level of their own expenditure and revenue, $S\hat{E}$ and $S\hat{R}$, but they have no concern for the level of central government expenditure and revenue. This final assumption is not critical and our analysis does not alter if we specify an optimal level of central expenditure/revenue from the viewpoint of sub-central politicians. In practice, sub-central politicians realise that they have little or no direct influence over central fiscal policy and are instead likely to be almost exclusively concerned with the expenditures/revenues within their local jurisdiction.

Given the likelihood of different preferences and political motivations etc, optimal sub-central expenditures as viewed by the sub-centre may not necessarily

[8] The frequent use of powers of the centre to 'cap' the autonomous tax revenues of UK Local Governments is a prime example – see Emmerson et al. (1998).

coincide with the equivalent optimal level preferred by the centre (i.e. $S\hat{E} \neq S\overline{E} and, S\hat{R} \neq S\overline{R}$). We assume that each government's preferences for expenditure and revenue are single-peaked[9].

The general government (or national) fiscal balance can be written as follows:

$$G_{bal} = CT + SR - CE - SE \qquad (5.5)$$

which by substituting 5.1 and 5.3 can be re-arranged to give:

$$G_{bal} = \delta + \varphi(y) + SR - \alpha - \beta(y) - SE \qquad (5.6)$$

To analyse the budgetary accounting implications of alternative fiscal decentralisation structures during consolidation attempts, we introduce a negative output 'shock'. This forces firstly the central and then by implication, the general government fiscal positions into deficit. Given our assumption that the general government fiscal position must always be in balance, consolidation is required.

To illustrate this, suppose that initially both the central and sub-central fiscal positions are balanced but there is a negative shock to output (y)[10]. Consequently, given equations (5.1) and (5.3), central government expenditures will rise (by the amount βy), while central tax revenues will fall (by the amount φy). Thus, G_{bal} given

[9] Thus if actual expenditure differs from optimal expenditure any policy option which has the potential to more closely align actual with optimal expenditure will be adopted.
[10] Given our simple framework there is no incentive for either government to run anything other than balanced budget at the outset.

by (5.6) will be negative and hence a national consolidation to expenditures and revenues is necessary (either at the central, sub-central or both tiers of government) - i.e.

$$G_{bal} = \delta + \varphi(y) + SR - \alpha - \beta(y) - SE < 0 \qquad (5.6a)$$

In what follows we compare and contrast the ability of the centre to respond to this situation by examining the policy instruments available to them under alternative sub-central financial arrangements.

5.3. Centralisation

In the first scenario we assume that all fiscal instruments are assigned to the central level – i.e. there is no decentralisation. In this case, the expenditure and revenue denoted SE and SR are effectively individual components of non-cyclical central government expenditure and revenue. Thus, central government has direct control over both their 'own' instruments δ and α, but in addition, sub-central expenditure and revenue (SE and SR). Given the preferences of the central government discussed above, these expenditures and revenues will initially be set equal to $S\overline{E}$ and $S\overline{R}$ respectively.

Following the negative output shock the central fiscal balance will be negative:

$$C_{bal} = \bar{\delta} + \varphi(y) - \bar{\alpha} - \beta(y) < 0 \qquad (5.7)$$

which in turn feeds through to a negative general government balance:

$$G_{bal} = \bar{\delta} + \varphi(y) + S\bar{R} - \bar{\alpha} - \beta(y) - S\bar{E} < 0 \qquad (5.6a)$$

In such a situation the central government has a number of fiscal instruments it can use to restore general balance. Firstly, the centre can adjust their 'own' non-cyclical expenditures and revenues denoted by δ and α respectively. By increasing δ and cutting α by appropriate amounts they can restore equilibrium. Secondly a surplus can be generated on the 'sub-central' balance, compensating for the deficit at the central level: i.e. –

$$SC_{bal} = SR^{new} - SE^{new} > 0 \qquad (5.8)$$

where it is possible that,

$$-C_{bal} = SC_{bal}^{new} \qquad (5.9)$$

Thus the centre has the ability to adjust both their 'own' expenditures and revenues but in addition, they can alter those of the sub-centre. Clearly this simple framework cannot determine the actual composition of the adjustment chosen (the exact change will depend upon utility costs associated with moving away from 'optimal' levels of central and sub-central expenditures and revenues). It is sufficient

to note that under a system of centralisation the centre is able to effectively control all instruments of national fiscal policy to assist in any adjustment.

The case of full centralisation is a useful benchmark against which alternative scenarios of decentralisation can be compared. We begin with the polar opposite case, full autonomous fiscal decentralisation.

5.4. Full Decentralisation

Under full decentralisation, we assume that the sub-central tier has full fiscal autonomy in that their expenditures (SE) are financed entirely from own-source taxation (ST). In the literature, own-source taxation revenues can be referred to as assigned, devolved and autonomous taxation revenues. They are identical however, in that they refer to revenues received from taxation which the sub-centre is able to raise and administer, independently from the centre.

In this scenario, the sub-central government will set SE = $S\hat{E}$ in line with their pre-determined exogenous preferences. Consequently, given their inability to issue debt this implies an optimal level of revenue SR = $S\hat{T}$ so that, $S\hat{E} = S\hat{T}$. In such a scenario, the general government budget balance,

$$G_{bal} = \delta + \varphi(y) + SR - \alpha - \beta(y) - SE \qquad (5.6)$$

where, SR = $S\hat{T}$ and SE = $S\hat{E}$ can be re-written to give,

$$G_{bal} = \overline{\delta} + \varphi(y) + S\hat{T} - \overline{\alpha} - \beta(y) - S\hat{E} \qquad (5.10)$$

Given $S\hat{E} = S\hat{T}$, the general government fiscal position in equilibrium becomes,

$$G_{bal} = \overline{\delta} + \varphi(y) - \overline{\alpha} - \beta(y) \qquad (5.11)$$

As before, following a shock to output, the central fiscal balance is negative, forcing the general government balance (5.10) to be negative as well:

$$G_{bal} = \overline{\delta} + \varphi(y) + S\hat{T} - \overline{\alpha} - \beta(y) - S\hat{E} < 0 \qquad (5.10a)$$

and given $S\hat{E} = S\hat{T}$,

$$G_{bal} = \overline{\delta} + \varphi(y) - \overline{\alpha} - \beta(y) < 0 \qquad (5.11a)$$

In contrast to the situation under full centralisation, the central government's ability to respond to the shock is more limited. The centre is unable to run a surplus on the sub-central fiscal position to help finance their deficit brought on by the negative shock to output. Under full fiscal autonomy, any such surplus is run at the discretionary will of the sub-centre. However, from the sub-centre's perspective, their fiscal policy has been unaffected by the shock and hence they face no direct incentive to run a surplus (either by cutting expenditures or increasing revenues), as this would

mean moving away from their 'optimal' levels $S\hat{E}$ and $S\hat{T}$. In this instance, as can be observed from (5.11a), the only fiscal instruments available to the centre are autonomous expenditure (α) and revenue (δ). Consequently, the various options available to the centre to implement a consolidation are significantly more limited than under centralisation.

In the following section we depart from these two polar cases and assess the level of effective central control in decentralised systems but where the central government plays a key role in the financing of sub-central fiscal policy. We begin by analysing grant finance.

5.5. Grant Finance

For simplicity, we assume that in this instance all sub-central revenues are raised from central government block grants (i.e. they have no autonomous revenue raising power). Thus, SR = SG.

Under a system of grant finance, the level of grant assigned to the sub-centre is typically determined unilaterally by the centre or through some form of 'needs-based' formula[11]. While certain sub-central governments may have limited influence or bargaining power regarding their grant allocation, the ultimate decision on how much each sub-central government receives, typically remains the sole prerogative of the centre. Rodden (2003) points out that unlike revenues that arise as tax sharing

revenues, revenues from intergovernmental grants "are likely to be most subject to yearly central government discretion in their determination"[12].

To best capture the situation, we can interpret grant finance as a situation in which the centre raises an amount of revenue, via central taxation, to fund a pool of revenues (which we will denote X), which in turn, it transfers/redistributes to sub-central tiers in the form of grant allocations (SG). At the outset, we assume that the amount the centre raises in X is fully transferred to the sub-centre (via grants SG)[13]. Given the centre's pre-determined preferences for SE, $S\overline{E}$ this yields:

$$X = SG = S\overline{E} \qquad (5.12)$$

when, $S\hat{E} \geq S\overline{E}$

Provided that the 'optimal' level of SE as viewed by the centre ($S\overline{E}$) is less than or equal to the optimal level of SE as viewed by the sub-centre ($S\hat{E}$), actual sub-central expenditure will equal $S\overline{E}$. Otherwise the sub-centre would set SE = $S\hat{E}$ and there would be a sub-central surplus of X - $S\hat{E}$ [14]:

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[11] Even such 'formulas' are often highly dependent on the discretion of the centre – see Rodden (2003) and Stegarescu (2004).

[12] Rodden (2003).

[13] There is no reason to expect that the centre will set X>SG at the outset, as then the centre would be running a pointless surplus.

[14] We would expect that the optimal level of sub-central expenditure as viewed by sub-central politicians be higher than the equivalent central government optimal level. Empirical evidence of the 'flypaper' effect (see Hines and Thaler (1996)) shows that increases in grants bring about equal increases in expenditure, suggesting that the actual level of sub-central expenditure is lower than the optimal level from the viewpoint of sub-central governments. While the existence of 'targets' and guidelines suggests that central government preferences for particular expenditures may be lower than the centre would like, for the most part, we would expect that sub-central preferences for total expenditure will be higher.

$$X = SG > SE = S\hat{E}$$
$$X - S\hat{E} = S_{surplus} \qquad (5.12a)$$

when, $S\hat{E} < S\overline{E}$

Under a system of grant financed sub-central expenditure the general government budget constraint 5.6 can be re-written as

$$G_{bal} = \overline{\delta} + \varphi(y) + X - \overline{\alpha} - \beta(y) - SG \qquad (5.6a)$$

If $S\hat{E} \geq S\overline{E}$, given 5.12, the budget constraint in equilibrium is identical to that under full decentralisation – i.e.:

$$X = SG = S\overline{E} \qquad (5.12)$$

Hence,

$$G_{bal} = \hat{\delta} + \varphi(y) - \hat{\alpha} - \beta(y) + [X - S\hat{E}]$$
$$G_{bal} = \hat{\delta} + \varphi(y) - \hat{\alpha} - \beta(y) + [X - SG] \qquad (5.11)$$
$$G_{bal} = \hat{\delta} + \varphi(y) - \hat{\alpha} - \beta(y)$$

While if $S\hat{E} < S\overline{E}$, given 5.12a:

$$X = SG > SE = S\hat{E}$$
$$X - S\hat{E} = S_{surplus} \qquad (5.12a)$$

the general government budget constraint becomes –

$$G_{bal} = \overline{\delta} + \varphi(y) - \overline{\alpha} - \beta(y) + [X - S\hat{E}] \qquad (5.13)$$

Following a shock to output as before, both the central and general government fiscal balances move into deficit:

$$G_{bal} = \overline{\delta} + \varphi(y) + X - \overline{\alpha} - \beta(y) - SE < 0 \qquad (5.6b)$$

As above, in order to balance the budget a consolidation is necessary. Clearly, one option open to the centre is to adjust their own non-cyclical expenditure (α) and revenue (δ). However, in contrast to the full autonomy case discussed above, there is now an important additional instrument the centre can exploit. Following the shock, the centre can drive a wedge between the amount of money raised in the revenue pool assigned for sub-central grant transfers (X) and the actual level of grant (SG) they transfer. That is, $X \neq SG$. By cutting the level of grant SG (while holding X constant), the central government can in effect generate a fiscal 'surplus' at the sub-central level which can be used to compensate for the deficit at the central level.

To illustrate this point, consider the case where $S\hat{E} \geq S\overline{E}$ - i.e. the respective optimal sub-central expenditure levels are higher for sub-central as oppose to central administrations. As discussed above, this corresponds to $X = SG = S\overline{E}$. Consequently, any reduction in SG (below X) will bring about a corresponding fall in SE (as the starting point $S\overline{E}$ is below the sub-central's optimal level of expenditure $S\hat{E}$ and hence any expenditure smaller than that allowed for by the grant, will be sub-

optimal given the assumption of single-peaked preferences). By reducing SG to SG^{new} and hence SE to SE^{new}, the central government can retain the difference $X–SG^{new}$ as a contribution to the consolidation attempt. Thus in effect, the central government can generate a cut in national expenditure for the same level of national revenue with the cut in expenditure being purely limited to the sub-central tier. In an extreme case the government could set $X–SG^{new}$ to be sufficient to eliminate the general government deficit generated by the output shock – i.e.

$$G_{bal} = \bar{\delta} + \varphi(y) - \bar{\alpha} - \beta(y) + [X - SG^{new}] = 0 \qquad (5.6b)$$

In essence, the centre is able to 'force the hand' of the sub-centre into adjusting their expenditures without requiring a similar cut at the central level or a reduction in national revenue. Thus in line with our observations from the previous two chapters, during consolidation attempts the centre can exploit the reverse 'flypaper' effect, generating cuts in sub-central expenditure for the same level of national revenue.

Alternatively, by raising the amount of revenue located in the pool of resources for sub-central transfers (X), provided that this increase in revenue is not passed on to the sub-centre in the form of grants, the centre is again able to generate a surplus on sub-central finances[15]. That is, the centre could raise X to X^{new} and keep SG constant, retaining the difference $X^{new} – SG$ as surplus. In an extreme case the

[15] Any increase in X that is passed on to the sub-centre in the form of grants will lead to an automatic rise in sub-central expenditures SE.

government could set X^{new} – SG to be sufficient to eliminate the general government deficit generated by the output shock – i.e.

$$G_{bal} = \bar{\delta} + \varphi(y) - \bar{\alpha} - \beta(y) + [X^{new} - SG] = 0 \qquad (5.6b)$$

Thus under a system of expenditure decentralisation financed by grants the centre's effective control of aggregate national fiscal policy is identical to that under a system of full centralisation. By raising X they can in effect increase sub-central revenues for a given level of national expenditure or by cutting SG they can cut sub-central expenditures for a given level of national revenue.

In the unlikely case where $S\hat{E} < S\bar{E}$ (5.12a), cutting the grant will initially have no impact on SE as the level of grant provided by the centre exceeds the sub-centre's 'optimal' level of expenditure and hence a surplus is already being run. In this case, only when the cut in grants is sufficiently large so that SG < $S\hat{E}$ (i.e. the case outlined above in 5.12), will sub-central expenditures start to fall. However, given that a surplus exists in the first place there is no logic in adopting such a strategy. The centre could of course increase the sub-central surplus in this scenario by raising the amount of revenue located in the pool of resources for sub-central transfers (X).

Note that when sub-central expenditures are financed by block grants, it is only the level of expenditure that can be controlled by the centre. The sub-centre will be able to alter the composition of this expenditure as they wish. However, if the grants are instead specific grants then the centre is able to control both the total size of

expenditure and the composition. As discussed in Chapter 1, in many instances, grants are tied to specific elements of sub-central expenditure such as education, health etc. By altering specific grants the centre can have direct control over particular elements of expenditure that they wish to target. This can be especially useful when profligacy in particular elements of sub-central fiscal policy, has been the primary cause of a deteriorating fiscal position. In addition, as we observed in Chapters 3 and 4, sub-central governments appear to have a bias toward cutting capital expenditures during periods of consolidation or central government tightening of resources and this can be prevented under a system of specific grants. Thus, under a system of grants, with many of these being specific, the centre is ideally placed not only to control the level of sub-central expenditure, but also the actual composition of any adjustment.

In summary, when sub-central expenditures are financed by grants, the level of central government effective control of national fiscal balances is similar to that under full centralisation. The centre is able to adjust not only their 'own' expenditures and revenues but also those of the sub-centre via manipulation of the grant system. In general, one can expect that cutting grants can lead to corresponding decreases in expenditure for a given level of national revenue. Alternatively, increasing revenue, provided such additional resources are not passed onto the sub-centre in the form of higher grant allocations (i.e. increase X but not SG), can generate an increase in general government revenue for a constant level of national expenditure. Thus, a central government wishing to undertake a consolidation attempt is not limited to their 'own' expenditures and revenues; they can in fact control sub-central expenditures and revenues even without the sub-centres' voluntary consent.

We contrast this situation of a high level of effective central control with that observed under a system of central and sub-central tax sharing.

5.6. Tax sharing

As in the case of grants, we assume that the sub-centre receives its entire resource allocation from tax sharing revenues (i.e. they have no autonomous revenue raising power). Thus, SR = ST_{share}. Further, in line with the majority of tax sharing arrangements (for example, Germany and Austria) the centre and the sub-centre are assumed to raise these 'shared' revenues from a common pool of resources with the shares assigned to each tier of government pre-determined[16]. Thus for example, a 50:50 split requires that 50% of all revenues raised from shared tax source be allocated to the sub-centre with the centre retaining the remaining 50%.

Further, for simplicity we assume that the tax sharing arrangement is such that the common pool of resources is a non-cyclical revenue pool with the tax share division 1:0 in favour of the sub-centre[17]. In other words, all tax revenues received from this pool of resources are assigned to the sub-centre. Therefore, X (the pool of resources used to finance sub-central expenditure) equals ST_{share}.

Like most tax sharing arrangements, we assume that the centre unilaterally controls the size of the pool of resources that the sub-centre receives via the tax

[16] Stegarescu (2004) in a study of sub-central tax arrangements in 23 OECD countries concludes that tax-shares are "in general fixed by laws or constitution".
[17] More complicated allocations (i.e. 50:50 or 75:25 etc) are possible and they do not alter our conclusions.

sharing arrangement. Therefore, the centre determines both the tax base and tax rate and hence ultimately the total revenue raised. The sub-centre is assumed to have no authority over the raising and collection of these revenues. Given this, it is quite clear why it is justifiable to view such revenues as purely a central to sub-central transfer of fiscal resources.

For instance, given the centre's pre-determined preferences for SE, $S\overline{E}$, the centre can determine the appropriate tax base and rate that will give:

$$ST_{share} = S\overline{E} \qquad (5.14)$$

provided, $S\hat{E} \geq S\overline{E}$.

If the centre's 'optimal' level of SE ($S\overline{E}$) is less than or equal to the optimal level of SE as viewed by the sub-centre ($S\hat{E}$), actual sub-central expenditure will equal $S\overline{E}$. That is, the pool of resources assigned to the sub-centre equals the amount spent by the sub-centre $ST_{share} = S\overline{E}$. Therefore, as under a system of grants (and full centralisation) the centre is able to determine the exact level of sub-central expenditure even if this falls short of what the sub-centre would ideally like. Moreover, by cutting ST_{share} the centre can (just like under a system of grants) 'force the hand' of the sub-centre into cutting expenditure (SE). Clearly, in the alternative scenario where the centre's optimal level of SE ($S\overline{E}$) exceeded the sub-centre's optimal level ($S\hat{E}$) sub-central politicians would set SE = $S\hat{E}$ generating a surplus equal to the difference $ST_{share} - S\hat{E}$:

$$ST_{share} > SE = S\hat{E}$$
$$ST_{share} - S\hat{E} = S_{surplus} \qquad (5.14a)$$

Therefore, at a first glance, tax sharing and grants appear to be very similar. However, in the context of a national fiscal consolidation attempt there are important differences between grants and tax sharing arrangements which we outline below.

Under a system of tax sharing the general government budget constraint 5.6 can be re-written as

$$G_{bal} = \delta + \varphi(y) + ST_{share} - \alpha - \beta(y) - SE \qquad (5.6c)$$

If $S\hat{E} \geq S\overline{E}$, given 5.14 the budget constraint is identical to that under full decentralisation – i.e.:

$$ST_{share} = S\overline{E} \qquad (5.14)$$

Hence,

$$G_{bal} = \overline{\delta} + \varphi(y) - \overline{\alpha} - \beta(y) \qquad (5.11)$$

While if $S\hat{E} < S\overline{E}$, given 5.14a:

$$ST_{share} > SE = S\hat{E}$$
$$ST_{share} - S\hat{E} = S_{surplus} \qquad (5.12a)$$

the general government budget constraint becomes –

$$G_{bal} = \bar{\delta} + \varphi(y) - \bar{\alpha} - \beta(y) + [ST_{share} - S\hat{E}] \quad (5.15)$$

As above, following a shock to output both the central and general government fiscal balances (5.6a) move into deficit:

$$G_{bal} = \bar{\delta} + \varphi(y) + ST_{share} - \bar{\alpha} - \beta(y) - S\hat{E} < 0 \quad (5.6d)$$

As in the previous examples, one option open to the centre is to adjust their 'own' non-cyclical expenditure (α) and revenue (δ). However, unlike the situation of grants (or indeed full centralisation) these are likely to be the only policy options available.

Under a system of tax sharing with pre-determined shares, provided that $S\hat{E} \geq S\bar{E}$ (the most realistic case), the centre is unable to alter their fiscal instruments/elements of sub-central control in such a manner so as to generate a sub-central fiscal surplus. While the centre can 'force the hand' of the sub-centre to determine the actual level of expenditure they cannot force the creation of a fiscal surplus.

To illustrate this, when $S\hat{E} \geq S\bar{E}$ this corresponds to $ST_{share} = S\bar{E}$ (so $S\hat{E} > ST_{share}$) and the general government balance can be re-written as:

$$G_{bal} = \bar{\delta} + \varphi(y) + ST_{share} - \bar{\alpha} - \beta(y) - S\bar{E} < 0 \quad (5.16a)$$

Suppose the centre tried to increase the pool of resources from which ST_{share} is drawn from (i.e. increase X to X^{new}), keeping the ST_{share} constant and hence retaining the additional revenue for itself (i.e. X^{new}–ST_{share}); in effect, attempting to drive a wedge between the pool of resources for sub-central transfers (X) and the amount actually redistributed (ST_{share}) just like in the case of grants discussed above. Such action is however, not possible. In doing so the central government would violate the tax sharing agreement, which requires that the share of revenues from the common pool distributed between the central and sub-central tiers remain fixed. While the centre has full authority to alter the size and composition of the common pool of resources used in the tax sharing arrangement, it cannot alter the shares assigned to each tier. In our case the tax share was assumed to be set at 1:0 in favour of the sub-centre (so X = ST_{share} at all times). If the centre retained an amount of this additional revenue, their share of the shared tax would be non-zero[18].

If $S\hat{E} > ST_{share}$, any attempt to raise revenues by increasing ST_{share} will fail to improve the general government balance (G_{bal}). The increase in ST_{share} would be matched by a compensating increase in SE as sub-central politicians more closely align actual expenditure with their own desired expenditure $S\hat{E}$[19]. Thus, any sub-central fiscal surplus generated from increased revenues would be cancelled out by

[18] A tax sharing arrangement where the centre is able to unilaterally alter the tax shares, as is in Norway, is however, more reconcilable with grant finance.

[19] This implication is discussed in a different context in De Mello (2000). He points out that "in the case of revenue sharing arrangements, every time a central government raises taxes to improve its own fiscal position, subnational governments receive a corresponding revenue benefit which they are free to spend."

the increased expenditures. In effect, if $S\hat{E} > ST_{share}$ then up to the point where $ST_{share} = S\overline{E}$ the general government budget balance (5.14a) following the output shock can be re-written as:

$$G_{bal} = \overline{\delta} + \varphi(y) - \overline{\alpha} - \beta(y) < 0 \qquad (5.11)$$

Therefore, the fiscal instruments available to the central government are limited to their 'own' autonomous expenditure (α) and revenue (δ). Note that this is identical to the situation under full decentralisation. Ultimately, if $ST_{share} = S\hat{E}$ then any increase in ST_{share} would improve G_{bal} as the additional revenues would no longer be spent on higher expenditures as optimality has been reached. As mentioned above however, if $S\hat{E}$ exceeds $ST_{share} = S\overline{E}$ by a substantial amount (which is quite possibly the case), this option may be unrealistic.

An alternative strategy for the centre, instead of increasing revenue, is to 'force the hand' of the sub-centre to cut their expenditures. Applying the same reasoning as in the case of grants, the centre can cut ST_{share}. While this will bring about a corresponding fall in SE (as the starting point $S\overline{E}$ is below the sub-central's optimal level of expenditure $S\hat{E}$), it in turn implies a cut in national revenue given the pre-determined fixed tax shares (i.e. $X = ST_{share}$). Therefore, both X and ST_{share} must fall. The two effects (cut in expenditure and cut in revenue) cancel each other, leading to no improvement in the general government deficit (G_{bal}). Therefore, under a system of tax sharing with pre-determined or fixed tax shares, the centre cannot instigate a cut in sub-central expenditures for a given level of national revenue.

As an important aside, it is possible that central governments may be unwilling to cut revenues from tax sharing arrangements in any instance. It is possible that the revenues received by sub-central governments from tax sharing will be viewed differently by both governments than revenues received from grants. From the fiscal illusion literature[20], it is possible to argue that individuals view intergovernmental transfers and 'own-source' revenues through different lenses. Under tax sharing it is highly plausible that the revenue raised from tax sharing is interpreted as having been 'earned' by a particular region/government and not a fiscal handout from the centre. Grants on the other hand, create the appearance of funding by non-residents. This is especially likely to be the case if the shared tax-base relates to income or corporation profits; two of the most commonly shared taxes. In fact, the view that shared tax revenues are 'earned' raised is one of the main arguments in favour of tax sharing as opposed to grants. Under tax sharing while the sub-centre has no responsibility over the setting of the actual tax base or tax rate, they can control the *size* of the tax base within their own jurisdiction. Policies and innovations which improve the tax base within their region (for example policies which encourage inward migration, innovation, business start-ups etc) can boost the revenues they receive. On the other hand, policies which harm the tax base only serve to reduce revenues. Each sub-central jurisdiction has therefore, the incentive under tax sharing systems to aim to be as successful as possible, increasing their 'earnings' from the shared taxes. In our case above, while the sub-centre cannot control the tax rate or what the actual tax base is, they can boost revenues by increasing the size of the tax base that the revenues are drawn from. An effective tax sharing system therefore,

[20] The Fiscal Illusion literature argues that certain 'types' of fiscal policy may be viewed differently from each other by the private sector even if they have the same effect on the economy. For a discussion and theoretical application to intergovernmental grants see Oates (1979).

should not be viewed in the same light as grants. Thus, to the extent that revenues from tax sharing are believed to have been 'earned' by a particular sub-central government, the degree of practical central control may be less than that under grants. As altering these revenues has the potential to be politically more sensitive and problematic than cutting grant levels.

Being seen to be taking resources *from* a particular region as to opposed to reducing resources *given to* a particular region is likely to be far more politically difficult. In this sense, even during consolidation attempts, the centre may be less able in practice to alter tax sharing revenues as opposed to grants. This is likely to be especially relevant if the tax being shared is one where the base of the tax is influenced heavily by sub-central policies. For example, in Norway the central and sub-central tiers of government, share revenues from income tax. One of the main motivations behind this policy is to encourage sub-central governments to try to increase their tax base by implementing 'good government', in order to gain from high revenues in the future[21]. While the Norwegian central government is able to unilaterally alter the tax shares allocated to each tier, they may be unwilling to do so for fear of eroding these performance incentives for sub-central tiers.

If $S\hat{E} < S\overline{E}$ (i.e. optimal sub-central expenditures were less than the centre would like) any increase in ST_{share} to ST_{share}^{new} could lead to an automatic improvement in G_{bal}. In this situation, the increase in revenue would fail to generate an increase in sub-central expenditure as it is already at optimum. The difference between the new higher ST_{share}^{new} and $S\hat{E}$ could be retained as surplus (i.e. ST_{share}^{new}

[21] See IMF (1997).

$-\ S\hat{E}$). In an extreme case the government could set $ST_{share}^{new} - S\hat{E}$ to be sufficient to eliminate the general government deficit generated by the output shock – i.e.

$$G_{bal} = \overline{\delta} + \varphi(y) - \overline{\alpha} - \beta(y) + [ST_{share}^{new} - S\hat{E}] = 0 \qquad (5.6c)$$

However, it is still the case that the centre is unable to bring about a cut in sub-central expenditures without altering ST_{share}. In this case, a cut in SE will only occur when ST_{share} falls by a sufficiently large amount such as to generate $ST_{share} < S\hat{E}$. Once again, with fixed tax shares, any attempt by the centre to cut sub-central expenditure requires a corresponding fall in national revenue.

It is therefore, clear that tax sharing and grant based sub-central financing systems imply very different degrees of effective central government control over sub-central fiscal policy in the context of a fiscal consolidation attempt. Only in the special and probably unrealistic case of optimal expenditure from the perspective of sub-central politicians being less than that which the central government would like, can the centre use sub-central balances to assist in any consolidation attempt under a system of tax sharing. Even then, any adjustment is limited to increases in sub-central revenue, changes in sub-central expenditure cannot be induced by the centre's actions. This inability of the centre to generate a sub-central fiscal surplus is more akin to the situation under a system of full decentralisation. Moreover, revenues from tax sharing are typically block transfers and are not tied to specific elements of expenditure. Therefore, unlike under a system of specific grants where the centre is able to control

both the level of expenditure and the composition, under tax sharing, they are unable to control either.

The tax sharing structure that we have outlined in the above is such that the sub-centre has no control to alter the tax rate or the tax base. In many countries however, the sub-centre is able to set (within limits) an autonomous tax rate on a tax base which they share with the centre. This is the system of income tax sharing common in Scandinavian countries. In practice as discussed in Chapter 1, nearly all sub-central governments set their tax rates at the 'ceiling' level. In such a situation, the analysis discussed above still holds. In order to increase sub-central taxation revenues the centre must lift the 'ceiling' level so that the sub-centre can set a higher tax rate, however increased revenues are likely to be passed on to increased expenditures. If the centre wished to cut sub-central expenditures, a lowering of the 'ceiling' is possible but this would also result in declining national revenues. Therefore, under this system of tax sharing, an analogous result is obtained; the level of effective central control is relatively limited.

In summary, via some simple budgetary accounting we have shown that, while both grants and tax sharing result in a degree of central control over sub-central expenditure and revenue, there is an important difference between the two in the context of a national consolidation attempt. Under a system of grant finance the centre is able to 'force the hand' of the sub-centre to cut their expenditure for a given level of national revenue. In contrast, this is not possible in a tax sharing system. Provided that sub-central politicians have a preference for expenditures that exceed the level of resources the centre is willing to transfer (i.e. $ST_{share} < S\hat{E}$), any attempt to lower sub-

central expenditure requires a reduction in national revenue. Thus, while a system of grants can be closely aligned to a system of full centralisation, a tax sharing arrangement substantially reduces the de facto power of the central government to consolidate national fiscal policy.

5.7. Conclusion

In this chapter we have demonstrated via simple budgetary accounting analysis important differences in the level of effective central government control under alternative sub-central financing regimes.

An important element of the recent fiscal decentralisation literature has been to criticise previous empirical studies for failing to accurately measure the level of central control over sub-central finances, by attributing all sub-central taxation revenues as being 'own-source'. It has been argued that the failure to take into account the existence of tax sharing arrangements can result in a serious underestimation of the level of effective central government control.

We have shown in this chapter however, that there are important differences between tax sharing systems and grants in terms of the level of effective central government control in the context of a consolidation attempt. While under a grant based system, the central government retains the same degree of effective control as under full centralisation, this is not the case under a tax sharing system. Under the most common form of tax sharing system, where the shares of the total tax pool each

government receives are either pre-determined, or where alteration requires the mutual consent of both tiers, the level of effective central control is in fact much more limited. Furthermore, given the different incentive effects inherent in tax sharing and grant regimes, coupled with the use of specific grants, it is our opinion that the relative control by the centre during consolidation attempts is further enhanced under a system of grants relative to a system of tax sharing.

In summary, we consider that it is inappropriate to view grants and tax sharing as identical methods of transferring resources from the centre to the sub-centre since the degree of effective central control over these transfers differs substantially. This conclusion has important policy implications for countries debating whether to switch from a system of grant finance to one of tax sharing or vice versa.

5.8 References

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Chapter 6

"The Impact of Decentralisation on National Consolidation Attempts[1]"

6.1 Introduction

In previous chapters we have analysed the important but previously ignored role of sub-central tiers of government during consolidation attempts and we have shown that they are a key element in successful attempts. Interesting related questions concern the ways and extent to which decentralisation within a country impacts on consolidation attempts. The increased drive toward greater decentralisation across many countries has led a number of economists to ponder whether or not there are any side effects for the macroeconomy. Tanzi (2001) and Prud'homme (1995) both hypothesise that increased levels of decentralisation, by limiting both the economic and political authority of the central government, can lead to greater macroeconomic instability[2]. They argue that divisions between tiers of government will serve to reduce the instruments available to the centre to protect the economy from unforeseen shocks. In the context of a consolidation attempt, their argument would suggest that, by weakening the fiscal tools of the centre, decentralisation could reduce the

[1] We are grateful to participants at the Regional Science Association British and Irish Section 2004 Conference for comments and discussion on an earlier draft of this Chapter. We would also like to thank the course instructors at the European Science Foundation Workshop on Limited Dependent Variable analysis, Professors J. Hagenaars and A. McCutcheon, for guidance on estimation techniques.

[2] For example, Tanzi (2001) argues that "with a decentralised fiscal structure, it becomes more difficult to co-ordinate the fiscal actions of national and sub-national jurisdictions to achieve the macroeconomic objectives of a counter-cyclical policy".

likelihood of successful consolidation. As yet, to our knowledge, there have been no empirical studies to test whether this is true. We aim to shed light on this question in this chapter.

The potential avenues through which decentralisation can impact on the consolidation process stem primarily from the political economy literature. Political economy approaches to fiscal policy conduct have become an important area of research in recent years[3]. In the context of the performance of fiscal policy, this has involved studying the influence of different forms of government, electoral laws, political polarisation and budgetary procedures on fiscal outcomes. At the same time, it is highly probable that the course of politics can be affected by economic events, with the electoral fortunes of many incumbent governments being determined by their economic and fiscal policy record.

One area of this literature which is largely underdeveloped but has received more recent attention, is the impact of decentralisation on fiscal outcomes. For the most part, the federalism literature has been normative in nature, discussing topics such as the optimal size of sub-central jurisdictions, the most appropriate form of local taxation and so forth[4]. However more recently, there has been more limited research from a 'positive' viewpoint. One branch of this literature has been to examine the relationship between decentralisation and size of government – again see Chapter 1. The Leviathan hypothesis, postulated by Brennen and Buchannan (1980) argues that decentralisation can yield positive benefits to society by curtailing the

[3] In fact, the general exploration of the boundaries between politics and economics pertinent to macroeconomic policy, is one of the most studied areas of modern macroeconomics. For a textbook analysis of these issues see Persson and Tabelleni (2000).
[4] See Chapter 1 and the references therein.

rent-seeking tendencies of central governments, however, as already discussed, empirical support for this hypothesis is mixed.

Apart from these limited studies of government size, there has been little analysis of the potential political economy aspects of decentralisation on fiscal outcomes. In this chapter we therefore discuss the potential impact that decentralisation may have on the consolidation process. While it is possible that successful consolidations may be considered easier to implement in a decentralised environment, the balance of political economy literature would suggest that by fragmenting fiscal policy decision making across tiers of government, successful consolidation is more difficult to achieve under decentralisation. The question we aim to empirically test is whether such issues have any practical relevance.

The outline of the remainder of this chapter is as follows. In Section 6.2 we present a brief review of the political economy approach to fiscal policy and examine the extent to which similar issues and concepts from this literature are relevant to our discussion of fiscal decentralisation and consolidation. One key argument that we observe from the political economy literature is that fragmentation in the budgetary process can lead to delayed, smaller and ultimately more temporary consolidation attempts than otherwise would have been the case. Additionally, and arguably more importantly, it can lead to a bias toward reliance upon revenue as oppose to expenditure adjustments. In Section 6.3 we test directly whether decentralisation, having conditioned upon various economic and political variables, is a significant determinant of both the composition and size of our identified consolidation attempts. From this, in Section 6.4 we are able to apply limited dependent variable analysis to

assess directly whether decentralisation increases or reduces the likelihood of a successful consolidation being implemented. We make use of the alternative measures of success outlined in Chapter 2 to differentiate between consolidation outcomes, applying both binary and ordered limited dependent methods to the respective classifications.

Our analysis extends the current literature in two directions. Firstly, there have been few studies examining the impact of both political and 'economic' factors on the likelihood of successful consolidation. The majority of the literature to date has tended to focus upon one particular aspect (i.e. political *or* economic factors). For example, Von Hagen *et al.* (2001) compare and contrast the macroeconomic conditions associated with successful and unsuccessful consolidations while Alesina *et al.* (1998) examine the ability of alternative central government types to implement successful consolidations with little consideration of the macroeconomic environment. Secondly, our main contribution is to examine the implications of decentralisation on consolidation attempts controlling for 'other' political factors. As mentioned above, prior studies of fiscal consolidation implicitly assume that national fiscal policy is conducted at a single level of government and the potential for politics to play a role in budgetary formation occurs only within this tier. As we have demonstrated throughout earlier chapters of this thesis, sub-central governments play an important and active role in national fiscal policy and hence consideration of the potential implications of decentralisation is warranted.

Our key empirical results can be summarised as follows. The analysis conducted in this chapter suggests that there is some evidence that decentralisation

has an impact on the nature of consolidation attempts. We find limited evidence to suggest that consolidation attempts implemented in countries with higher levels of decentralisation tend to rely heavily upon revenue increases as oppose to expenditure cuts. However, our analysis also reveals that inference on the relationship between decentralisation and success depends upon the methodological approach adopted, and for the most part we do not observe a significant relationship. The analysis in this chapter is very much a first pass at this issue and there are no similar attempts that we are aware of in the current literature. The key to obtaining improved inference will probably lie in developing better measures of political/institutional indicators.

While we have constructed as accurate a measure as currently feasible of the extent of decentralisation within our sample countries we recognise the need for further research in this area. Therefore, in the penultimate section of this chapter we summarise some aspects of fiscal and political decentralisation and the potential for fragmentation between tiers of government, which our approximations do not fully capture. We briefly discuss some potential avenues of improvement for future research in this area. This is part of an agenda for future work in post-doctoral studies.

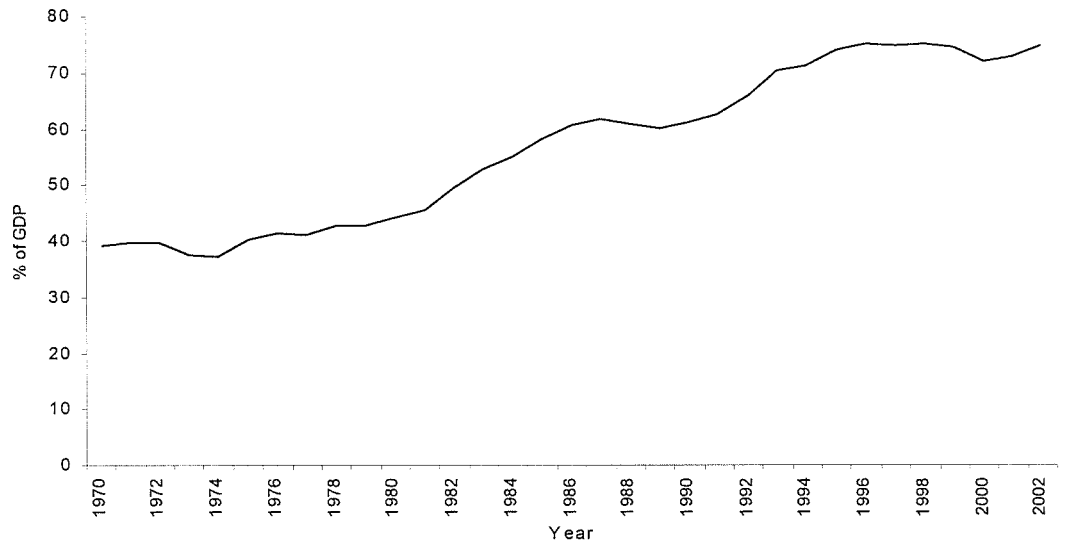
6.2 The Political Economy of Consolidations[5]

One of the most actively discussed questions in modern fiscal policy thought relates to the apparent observation of a 'deficit. This can be demonstrated by the fact

[5] For a survey of the political economy literature on fiscal policy consolidations see Perotti (1998).

that the average public debt ratio in the OECD has increased steadily over the last couple of decades - see Figure 6.1.

Figure 6.1: OECD Average Debt to GDP Ratio 1970 – 2002



The pattern of fiscal policy conduct and the levels of debt between countries has however, been far from homogenous with cross-country differences becoming as intellectually challenging to economists as the overall rise in debt/GDP ratios. Countries such as Germany and the UK have maintained relatively manageable debt levels, while others like Italy and Belgium, have suffered chronic deficits and/or high debt levels. Additionally, countries such as Ireland with historically high levels of debt, have recently managed to achieve significant reductions. The opposite is currently the case for Japan.

Attempting to explain these stylised facts in purely economic terms is both theoretically and empirically unsatisfactory. Country specific 'shocks' or prolonged influences of common 'shocks' are undoubtedly contributory factors however, it is

unlikely that they alone are sufficient to explain either the widespread debt accumulation or cross-country differences. In addition, recent fiscal performance in the OECD questions the relevance of the traditional approach to debt policy; the equilibrium (or tax-smoothing) theory of the budget[6].

More recent research has focussed on 'politico-institutional' factors by emphasising the interaction between economics and politics. The major strand running through this literature is that where there is some degree of fragmentation, either within the government or parliament, the greater the likelihood of weaker fiscal positions. Roubini and Sachs (1989) undertook the first formal examination of the relationship between politics and fiscal outcomes. They ran standard OLS regressions of the growth rate of debt to GDP on various economic and political controls. Their most important result was the observation that coalition and minority governments in the OECD where associated with higher public debt growth rates than their single party counterparts. Similar results can be found elsewhere. For example, Grilli *et al.* (1991) obtain an analogous result however, instead of discriminating between 'types' of government, they group countries according to whether they are deemed to be Representative, Majoratarian or Presidential democracies; Alesina *et al.* (1996) find a similar relationship between coalition governments and fiscal performance for Latin America; and Persson and Tabellini (2001) and Carmingani (2001) have found similar

[6] In this model, a benevolent fiscal authority uses budget deficits/surpluses to act as a buffer to 'smooth' the optimal tax rate, minimising the distortions associated with non lump-sum taxation. Consequently, the budgetary position of a country should move in and out of both surplus and deficit.

conclusions using more complex panel data methods[7].

It is also possible that partisan differences (i.e. left wing versus right wing parties) may also have an effect on fiscal outcomes. For example, Hibbs (1977) hypothesised that parties of the left are more concerned about unemployment than inflation than right wing parties and hence their monetary and fiscal policy strategies may be influenced by this. To test the significance of such effects, a number of studies including those that have examined the impact of coalition government on fiscal performance, have also tested the significance of political ideology. In the main, these studies have found no strong evidence of any relationship between political ideology and fiscal deficits. There is however, evidence that political ideology does determine government size, with left wing governments being associated with larger expenditure and revenue increases when in power than their right wing counterparts (see for example, Roubini and Sachs (1989), De Haan and Sturm (1997) and Alesina and Perotti (1995)).

In addition to political factors, there is a related less developed literature which emphasise the role of budgetary procedures. These are defined by Alesina and Perotti (1996) as the "rules, regulations and institutions determining how budgets are prepared, approved and implemented". A number of studies, including Von Hagen (1992), Von Hagen and Harden (1994) and Stein *et al.* (1998) have found that countries which have more collegial institutions at the central level (e.g. weak Finance

[7] This relationship has however, been disputed by Edin and Ohlsson (1991) who use the same data and estimation technique as Roubini and Sachs (1989) but re-classify government 'type' in certain observations in a manner which they believe to be more appropriate. In general however, it is widely accepted that fiscal performance in countries which typically return multi-party governments has been relatively weaker than in other countries. For a survey of this literature see Aleisna and Perotti (1994).

Ministers, longer legislative scrutiny of budgetary proposals etc) tend to have weaker fiscal positions[8].

Overall, the political economy literature offers the potential for explaining cross-country fiscal performance given that countries differ quite substantially in their electoral systems, party structures and political polarisation. What is more problematic however, is explaining why these factors have resulted in the patterns of fiscal policy observed in the last twenty years and not before.

One branch which can explain differences in recent fiscal performance is the political economy consolidation literature. This approach concentrates not on whether governments intentionally add to the debt, but on the relative abilities of different institutional frameworks to stabilise and ultimately eliminate the debt once it is in existence. This hypothesis stresses the significance of the 'debt trap' in that failure to address increasing debt levels in a swift and decisive manner may lead to weak long term fiscal positions as future primary surpluses may be insufficient to neutralise interest payments on outstanding debt (i.e. to service the debt). Roubini and Sachs (1989) hypothesise that the apparent deficit bias throughout the OECD, together with the heterogeneity in debt levels results from the first major oil shock in 1973, which forced all OECD countries into high debt, and that certain countries undertook substantial adjustments more swiftly than others.

[8] In this thesis, in line with Mulas-Granados (2002), Alesina and Perotti (1995), Alesina *et al.* (1998) and Alesina and Ardagna (1998) we have chosen to focus only on political factors in our analysis of consolidation attempts. The issue of budgetary institutions is important but it generates a number of additional complications as knowledge is required of institutional arrangements at both tiers and is best left for future research.

In essence, the literature argues that fragmentation within the budgetary process can impinge on both the timing and the nature of a consolidation attempt – see Perotti (1998) for a survey.

For example, Alesina and Drazen (1991) demonstrate that budgetary negotiations undertaken by coalition governments can resemble a 'war of attrition', with each party in the coalition willing to postpone consolidation in an effort to shift the burden of adjustment onto the other party. Ultimately, adjustment will take place when the cost of delaying another round of negotiations exceeds the cost of conceding and bearing the brunt of adjustment. This creates a greater delay than would have been the case in a unified coalition or single party government.

From an empirical point of view, there has been strong evidence to suggest that political factors do matter. Perhaps the most famous studies are those of Alesina, Perotti and a number of co-authors. In Alesina and Perotti (1995 and 1997), Alesina *et al.* (1998) etc, the relative abilities of different types of government to undertake successful fiscal consolidation attempts are assessed. They find that while coalition governments have just as high a probability as single party governments of attempting a consolidation, more often than not they fail to be successful[9].

It is argued that the primary reason for this distinction in success rates, is that in coalition governments the composition of their consolidations appear skewed toward revenue increases rather than expenditure cuts (see for example, Alesina *et al.*

[9] Poterba (1994) obtains somewhat similar results when analysing US states. He finds that states in which one party controls both the upper and lower houses in the legislature are more likely to respond quickly to unexpected/large deficits than their divided-government counterparts.

(1998), Grilli *et al.* (1991), Knotopoulos and Perotti (1999) and Hallerberg and Von Hagen (1997) and Mulas-Granados (2002)). As demonstrated in Chapters 3 and 4, consolidation attempts of this type are likely to be unsuccessful and coalition governments appear less able to implement the cuts to social transfers, wages and current expenditures in general that are critical to success. Our analysis in Chapter 4 adds an additional element to this conclusion. We observe that during consolidation attempts coalition governments did not tend to cut sub-central grant allocations as much as their single party counterparts.

A possible reason for this bias in composition is thought to be the following. The political costs of cutting government wages and employment, social transfers etc are likely to be quite high, and not just at the ballot box, because such policies go against the interests of entrenched bureaucracies. Therefore, strong, non-fragmented governments are required in order to deal with the potential political ramifications of any unpopular decisions. It is believed therefore, that coalition governments are ceteris paribus less able to make such cuts than single party governments (see Alesina *et al.* (1998)). Furthermore, in line with the Alesina and Drazen (1991) 'war of attrition' model, coalition governments may succumb to inter-coalition conflicts concerning the distributional consequences of any adjustment. To the extent that expenditures tend to favour particular groups in society more than general taxation, one should expect consolidation attempts that are implemented by coalition governments to have a bias against expenditure cuts. It is thought that such divisions become more relevant, and more problematic, as the number of players in the budgetary process increases, see for example Spolaore (2004). In addition, as demonstrated in Budge *et al.* (2000), coalition governments have shorter average

tenures than single party governments. The average duration of single party governments is 836 days, while for coalition governments the average duration is 537. Coalition governments therefore have less incentive to undertake fiscal reforms that generate long term improvements if such improvements will accrue outside their period of office. In fact, Grilli *et al.* (1991) demonstrate that budget deficits are themselves positively correlated with government durability

At the same time, Alesina and Perotti (1995) and Alesina *et al.* (1998) have found that left wing parties in OECD countries are more likely to implement a successful consolidation than either centrist or right wing parties. In fact, they find that centrist governments (in terms of ideology) seem incapable of undertaking successful consolidations. Mulas-Granados (2002) undertakes a more recent examination of the impact of ideology on consolidation in OECD countries but on this occasion focusing on composition rather than success. This study is an improvement on previous studies in that economic controls such as the output gap and monetary policy stance are also taken into account. He finds that left wing governments are more likely to base their consolidation attempts on revenue adjustment as oppose to expenditure adjustment. It is argued that this is consistent with the hypothesis that left wing governments favour larger sized governments than their right wing counterparts. Note however, revenue adjustments are less likely to be successful so there is an apparent inconsistency between this result and that of Alesina and Perotti (1995) and Alesina *et al.* (1998) discussed above[10].

[10] This apparent inconsistency is also evident in the results discussed below.

While this has been a rich area of theoretical and empirical analysis, existing studies have ignored the potentially significant impact of decentralisation. In our opinion, this is a significant weakness in that an important institutional element of national fiscal policy conduct is ignored. It seems to be the case that decentralisation itself can via political economy explanations have an impact on the consolidation process.

Firstly, it is possible that decentralisation may assist consolidation. One commonly cited argument in favour of decentralisation, is that it will limit the rent-seeking power of central governments. It follows that a Leviathan central government may be less willing to undertake necessary but difficult reforms than a central government whose power is actively constrained by sub-central units[11]. In addition, through encouraging greater participation in the political process, decentralisation may improve policy making in general. Undertaking difficult reforms may be easier given better-informed general public debate and understanding.

On the other hand, it is clear that decentralisation has the potential to hinder the consolidation process since it creates an additional source of political fragmentation in the budgetary process. In a decentralised system there is the potential for division between tiers of government (i.e. the centre versus the sub-centre) and between individual governments (i.e. central versus individual sub-central governments or between individual sub-central governments)[12]. As argued by

[11] It is also possible that by limiting the size of the government in the first instance, decentralisation itself leads to fewer required consolidations.

[12] Decentralisation may also yield administrative divisions, as consolidation across tiers of government requires active co-ordination. This may in turn reduce the transparency of the consolidation attempt – see Tanzi (2001).

Tsebelis (1990), fiscal decentralisation increases the number of 'veto players'[13] involved in fiscal policy. Thus it is possible for example to obtain a 'war of attrition' between different tiers of government rather than between different parties within central government.

In highly decentralised systems, the unilateral ability of the centre to stabilise the economy is more limited than under a fully centralised system[14]. Any national consolidation attempt will therefore require the active involvement of both tiers of government. To the extent that sub-central politicians are less likely to be concerned about the national fiscal position, and more about local fiscal policy outcomes and local politics and motivations, there is the potential for greater fragmentation in the policy making process.

Two important sources of potential fragmentation between the centre and the sub-centre are differences in preferences and political motivation.

A necessary consequence of delegating control of fiscal policy across tiers of government is that governments, with alternative preferences from one another, will control certain elements of national fiscal policy. We can identify three main potential sources of such division in the context of consolidation attempts. Firstly, central and sub-central politicians may not agree on the need for, or desirability of, consolidation.

[13] This veto power is especially relevant in countries that have a strong regional representation in the central legislature. For example, in Germany and Austria, the second chamber is composed entirely of representatives elected by the regional Länder. In others, such as the USA and Australia, regional constituents directly elect representatives to the second chamber. Such high levels of regional representation in central government strengthen the hand of the sub-central governments in any inter-governmental policy dispute. Moreover, as pointed out by Rodden (2002), virtually all of the distinguishing characteristics of political federalism imply limits on the central government's ability to regulate the fiscal activities of sub-central tiers.

[14] See Chapter 5.

Secondly, even if both tiers recognise the need for consolidation, the actual size of any adjustment may be disputed. Thirdly, there may be disagreement over the appropriate expenditure and revenue composition of any such consolidation attempt. For instance, differences of opinion can arise over matters such as which is the relevant tier of government to bear the burden of the adjustment, or whether sub-central expenditures should be cut by more than central expenditures. It is possible that sub-central governments may resist fiscal reforms instigated by the centre if they would prove unpopular to their constituents. For example, a key pillar of the centre's consolidation attempt might be to address an inflated national government wage bill. If a large part of the public sector pay bill is paid out by sub-central authorities, as is the case in many countries (see Chapter 1), then the sub-centre must agree on the wisdom of cutting their wage bill before undertaking similar cuts

Differences in political motivation can arise due to the various responsibilities faced by each tier of government. In practice, the central government is likely to be held accountable by the electorate both for overall macroeconomic performance and for national fiscal policy[15]. In contrast, sub-central politicians face different constraints and are likely to be primarily concerned with their own fiscal responsibilities. The national fiscal position is of less direct concern as, in general, one would expect that sub-central politicians are unlikely to suffer at the hands of the electorate as a result of a poor fiscal position at the general government level. Therefore, to the extent that sub-central politicians are 'office' motivated, they have a low incentive to instigate tough and sustained adjustment programs that improve the national fiscal position, particularly if in doing so they damage their own local

[15] In addition, international pressure with regard to a country's fiscal policy (from bodies such as Ecofin, the OECD and the IMF etc.) tends to be focussed on the central tier.

position through a reduction in service provision and/or increased local taxation[16]. In fact, Triesman (2000) argues that in certain countries sub-central governments may deliberately resist any central government attempt at reform to gain electoral support of regional interest groups etc. The concern that conflicting political goals can lead to intergovernmental inconsistencies in policy has motivated a companion political science literature – see for example Dillinger and Webb (1999) and Garman *et al.* (2001). These authors argue that, when national party leaders have limited capacity to discipline sub-central tiers, it can be extremely difficult for the central government to implement a coherent and unified policy agenda. It follows that in such cases, political or budgetary reform is likely to occur less frequently, be less dramatic and/or be structured so as to avoid changing politically sensitive elements.

Consequently, if a large proportion of expenditure is decentralised to sub-central tiers (without grant finance), and fragmentation between tiers is a realistic concern, the centre may face binding constraints on their ability to alter national fiscal policy during consolidation. Consolidation attempts will be centred upon those elements of fiscal policy over which the centre has unilateral control. There is no guarantee that these are the most appropriate or desirable elements of national fiscal policy on which to impose cuts. For instance, if a fiscal crisis was generated by an increase in the government wage bill, a fiscal consolidation should address this issue directly. However, if the government wage bill is paid primarily by sub-central tiers, who may be unwilling to co-operate, the centre may be forced to compensate by

[16] Moreover, where considerable responsibilities are devolved an inherent 'free-rider' problem may exist with each individual sub-central unit facing the incentive to ignore the consolidation effort given the high positive spill-over effects of national consolidation and the small spill-over effects on the national fiscal position of their 'own' consolidation. As a result, from a national perspective, sub-central politicians are likely to underestimate the benefits while at the same time overestimating the costs of their own contribution to any consolidation attempt.

cutting other elements of expenditure and/or raising revenue. Failure to address the source of fiscal difficulty is likely to limit the possibility of the consolidation attempt being successful[17]. In addition, where there are high levels of shared responsibility in service provision, adjustments made by one particular tier to the elements of service provision that they control, may generate distortions.

Therefore, an additional source of fragmentation can emerge when one looks at fiscal policy across tiers of government. It is possible that such fragmentation will generate analogous results to that within central government, with consolidation attempts in highly decentralised countries shying away from cuts to key elements of expenditure. Instead, governments wary about generating politically damaging conflict between tiers may choose to focus instead on less 'sensitive' elements such as revenue increases and so forth.

Further on a more practical level, even in a country with high levels of decentralisation a vertical imbalance is likely to remain – see Chapter 1. Thus, consolidation attempts instigated by central governments have the potential to be biased toward revenue increases, since these are the fiscal instruments over which they have the greatest control. Not only will they be able to reduce the grants (however, big or small) they allocate to the sub-central tier, they can also increase the revenues used to finance such transfers and choose to retain the excess. Furthermore, in countries where there is a large degree of sub-central fiscal autonomy, it is likely that the expenditures that remain under central control will typically be items which

[17] Tanzi (2001) considers such impediments to reform as a major problem with decentralisation. He argues that the Argentinean central government's reluctance in the 1990s to alter revenues that they shared with sub-central tiers led them to adjust those revenues they did unilaterally control, such as excise taxes. Tanzi argues that at this point in time, increasing excise duties did more harm than good.

are less likely to be cut during consolidation attempts, e.g. defence. Key elements such as the wage bill (as demonstrated in Chapter 1) tend to be assigned to sub-central tiers. In such a scenario, the fiscal tools available to the centre will be limited and again biased toward revenue adjustments.

In summary, there are a number of potential avenues through which decentralisation can impact the consolidation process and ultimately its chances of success. In the remainder of this chapter we test whether such factors do in fact appear to be of empirical importance.

6.3 Measures of Decentralisation

In this section we outline the two main measures of decentralisation used in our empirical study. In the current literature, measures of decentralisation have either been based on the economic/fiscal autonomy or the political autonomy of sub-central tiers. In what follows we test the significance of both. It is likely that there will be a high correlation between measures of fiscal and political autonomy. Our first measure we call 'fiscal decentralisation', while our second we call 'sub-central political autonomy'. We discuss each measure in turn.

6.3.1 Fiscal Decentralisation

As discussed in Chapter 5, expenditure decentralisation on its own is an insufficient measure of fiscal decentralisation, as it is necessary to take into account

how these expenditures are financed. As demonstrated, sub-central expenditures financed by grants are in effect controlled by the central government via the grant system. In contrast, sub-central authorities have far greater de facto powers over expenditures that are not financed by grants.

In constructing a measure of fiscal decentralisation we choose to differentiate sub-central expenditures according to how they are financed. To capture the degree of fiscal decentralisation in our sample we calculate the value of sub-central expenditures that are not financed by grants and express this value as a percentage of total general government expenditure. Note that we also take into account those tax sharing arrangements where the centre is able to alter the tax shares assigned to the sub-centre unilaterally[18].

We consider that this approach creates a relatively more accurate measure of actual fiscal decentralisation than simply using total sub-central expenditure (see for example, Oates (1985)) or sub-central revenue autonomy (see for example Stein (1999) and Rodden (2003)). Our approach enables us to measure the level of sub-central expenditure which the centre cannot directly control. The measure is a time series calculated for each year. The following table contains the sample averages for this measure for each country.

[18] For a discussion of why such revenues are identical to grants see Chapter 5. To undertake this adjustment we use the information provided in OECD (1999) on the percentage of total sub-central taxation that stems from such tax sharing arrangements and adjust revenues accordingly.

Table 6.1: Percentage of General Government Expenditures Conducted at the Sub-Centre in Excess of those Financed by Grants

Country	% of General Government Expenditures	Country	% of General Government Expenditures
Belgium	5.60	Austria	24.26
Netherlands	7.65	Finland	27.17
Norway	10.00	Australia	27.78
Ireland	10.64	Denmark	29.39
France	11.48	Sweden	32.26
UK	13.79	USA	35.39
Spain	14.69	Germany	36.42
		Canada	50.21

6.3.2 Sub-Central Political Autonomy

Our second measure is based on the political autonomy of sub-central units within a country. Using measures of the political power of the sub-centre in fiscal policy studies, as opposed to the level of fiscal decentralisation, has been common in the literature (see for example Wibbels (2000)).

An obvious classification that can be made, is to follow Wibbels (2000) and split countries along federal and unitary lines. This approach however, fails to fully capture differences between countries since there can be broad differences in the level of sub-central autonomy within federal and or unitary countries. As a better alternative, we construct a political autonomy index where the distinction between federal and unitary structures is only one component. Our measure is outlined in the following table.

Table 6.2: Measuring Political Autonomy

Fed vs. Unitary		De-Central		Upper House	
Value	Description	Value	Description	Value	Description
0	Unitary	**0**	No rights for sub-national govt.	**0**	Appointed directly/hereditary from central government or unicameral.
1	Semi-Federal	**1**	Limited rights	**0.5**	Directly elected.
2	Federal	**2**	Specific and irrevocable rights	**1**	Regions appoint upper house.

Construction of the index is largely self-explanatory. Countries are assigned a value of 0, 1 or 2 depending upon whether they are unitary, semi-federal or federal. The semi-federal countries include Belgium[19] and Spain in the pre-1990s period.

The variable De-Central is taken from Budge *et al.* (2000). This variable is designed to capture the rights of sub-central governments. In certain countries, such as the USA, Canada and Germany, Federal institutions often restrict the authority of the central government with explicit constitutional protections for sub-central units, which are often enforced by independent courts. In many, in at least some policy areas, the central government is unable to change the policy status quo without the agreement of a majority, supermajority and sometimes even unanimity of the sub-central units. If sub-central governments have specific rights vis-à-vis the centre that are formal and significant, they are given a score of 2; if they have some independent rights they are assigned a value of 1; and if they have no explicit rights and their

[19] Since 1970, Belgium has embarked on a process toward becoming a federalist state. It was formally classified as federal in 1994 (see Budge *et al.* (2000)).

authority is dependent on the will of the central government a value of 0 is assigned. For a discussion of this variable see Budge *et al.* (2000).

Finally, our third variable captures the sub-central representation at the centre via the second/upper chamber. If sub-central governments can elect or nominate members of this chamber, this implies that they can have a substantial degree of representation at the central level and hence a value of 1 is assigned. If members of this house are elected via regional/local elections then a value of 0.5 is assigned and if the centre either appoints members or the system is unicameral then a value of 0. Table 6.3 shows the values of our political autonomy index for the countries in our sample. In contrast to our measure of fiscal decentralisation this measure is constant across our sample (except for Spain).

Table 6.3: Construction of Sub-Central Political Autonomy Index				
	Federal vs. Unitary	**De-central**	**Upper House**	**Sub-Central Political Autonomy**
Australia	2	1	0.5	**3.5**
Austria	2	2	1	**5**
Belgium	1	1	0.5	**2.5**
Canada	2	2	0	**4**
Denmark	0	2	0	**2**
Finland	0	2	0.5	**2.5**
France	0	1	0.5	**1.5**
Germany	2	2	1	**5**
Ireland	0	1	0.5	**1.5**
Netherlands	0	0	1	**1**
Norway	0	2	0.5	**2.5**
Spain[20]	Pre –90 Post –90 1 2	1	0.5	Pre –90 Post –90 **2.5** **3.5**
Sweden	0	2	0	**2**
UK	0	1	0	**1**
USA	2	2	0.5	**4.5**

6.4 Decentralisation and the Composition and Size of a Consolidation Attempt

6.4.1 Introduction

Having outlined our methods to measure decentralisation across countries, we are now able to begin our analysis of the impact of decentralisation on the consolidation process.

[20] Given the substantial constitutional reform that has taken place in Spain during our sample period we define observations up until 1990 as having being taken place in a semi-federal system, and fully federal in the post 1990 period.

As discussed above, it is widely thought that fragmentation can skew the composition of a consolidation away from politically sensitive elements of fiscal policy. Consolidation attempts where fragmentation is strong are likely to avoid cuts to social transfers, government wages and so on. Instead, consolidations will be biased toward the less politically sensitive elements of policy such as types of tax increases and the retention of state enterprises' profits. Therefore, it is clearly of interest to test at the very outset, whether decentralisation has significant influence on the composition of a consolidation attempt.

Given data constraints we limit our focus to an empirical examination of total expenditure and revenue. We are able to differentiate between consolidation attempts which involve cuts to expenditure in excess of any revenue hikes[21]. In addition to including 'other' potential economic and political determinants of composition we also include our measure of decentralisation so that we are able to test directly whether decentralisation appears to skew the composition of a consolidation attempt toward revenue or expenditure.

There are a number of alternative econometric approaches that we can adopt to test whether countries are more or less likely to engage in expenditure or revenue adjustments during consolidations. We limit ourselves to just two alternative techniques. Firstly, we run seemingly unrelated regressions (SUR) to explain the sizes of the expenditure and revenue adjustments. Secondly, we use limited dependent variable analysis (LDV) to discriminate between those consolidations which are

[21] We do not look at the individual components of expenditure etc, the reason being that the cyclical adjustments we have made to expenditures and revenue have been at the aggregate level and not as individual components. Therefore, any analysis of how *adjusted* expenditures and revenues change can only be limited to the aggregate levels.

predominantly expenditure based and those that are based on revenue increases. In addition to a standard binary dependent variable model we also make use of a more refined ordered model. We believe that the use of an ordered model is an advantage as a more accurate division of consolidation attempts with respect to their relative reliance upon revenue or expenditure is possible. It is likely that an improved insight of the factors which help determine the composition of a consolidation can be obtained.

6.4.2 Seemingly Unrelated Regression (SUR) Estimation[22]

In our first method we estimate a SUR model on the percentage change in adjusted expenditures and revenues in the 61 consolidation episodes[23]. That is,

$$\mathbf{y}_i = \mathbf{X}_i\mathbf{b} + \mathbf{u}_i \qquad (6.1)$$

where $\mathbf{y}_i$ is an n x 1 vector of observations on the i^{th} variable (where i = % in expenditure and % in revenue); $\mathbf{X}_i$ an (n x k_i) matrix of observations on explanatory variables; $\mathbf{b}_i$ a (k_i x 1) vector of coefficients; and $\mathbf{u}_i$ an (n x 1) vector of disturbances. Equation 6.1 can be re-written,

$$\begin{bmatrix}\mathbf{y}_1\\ \mathbf{y}_2\end{bmatrix} = \begin{bmatrix}\mathbf{X}_1 & \mathbf{0}\\ \mathbf{0} & \mathbf{X}_2\end{bmatrix}\begin{bmatrix}\mathbf{b}_1\\ \mathbf{b}_2\end{bmatrix} + \begin{bmatrix}\mathbf{u}_1\\ \mathbf{u}_2\end{bmatrix} \qquad (6.2)$$

[22] SUR estimation was first introduced in Zellner (1962).
[23] The values for adjusted expenditures and revenues are taken from the calculations in the construction of the Blanchard Fiscal Impulse – see Chapter 2.

where y_1 is the percentage change in expenditure and y_2 is the percentage change in revenue. However as we will discuss below, the explanatory variables that we include in both regressions $\mathbf{X}_1$ and $\mathbf{X}_2$ are identical (i.e. $\mathbf{X}_1 = \mathbf{X}_2 = \mathbf{X}_m$) and therefore, the SUR estimator of equation 6.2 collapses to the OLS estimators of individual regressions on y_1 and y_2. So that $\mathbf{b}_1 = \mathbf{b}_2 = \mathbf{b}_m$ where,

$$\mathbf{b}_m = (\mathbf{X}'\mathbf{X})^{-1}\mathbf{X}'\mathbf{Y} \qquad (6.3)$$

One limitation of the estimation technique applied above, is that by measuring the total size of the change in expenditure and revenue, this does not tell us whether the consolidation is more or less expenditure based relative to the adjustment in revenue. Further, our results will be influenced to a certain extent by the actual size of government in each country. A 2% adjustment in expenditure will, in relative terms, be more severe in a country with low levels of government expenditure than one with higher levels. One way to circumvent this problem is to include country dummies. However, not only does the inclusion of 15 dummies substantially reduce the available degrees of freedom (given only 61 observations) we find that in addition, their inclusion together with our measures of decentralisation, type of government and political ideology lead to problems of high multicollinearity. An alternative method which circumvents this problem is to test what factors make a consolidation more expenditure based relative to the adjustment in revenue and vice versa. In this way, the scale effects of each country's fiscal policy are eliminated. To implement this strategy we have chosen to use limited dependent variable (LDV) estimation techniques.

6.4.3 Limited Dependent Variable Estimation

We adopt two different LDV models to conduct our analysis. Firstly, we classify our consolidation attempts according to the change in expenditure being greater or less than the adjustment to revenue. If for a particular consolidation attempt, the change in expenditure is greater than the change in revenue, we classify this consolidation as being 'expenditure based'. If on the other hand, the change in revenue is greater than the change in expenditure, we classify this as a 'revenue based' consolidation.

To estimate the model we can either apply a reduced form Logit or Probit model to the 61 consolidation observations. Such that,

$$y_i = \mathbf{X}_i\mathbf{b} + v_i \qquad (6.4)$$

where,

: $y_i = 1$ if adjusted expenditure > adjusted revenue and,

: $y_i = 0$ if adjusted expenditure adjusted revenue.

The probability of observing $y_i = 1$ is given by,

$$\Pr(y_i = 1|x_i, \beta) = 1 - F(-x_i'\beta) \qquad (6.5)$$

and it follows that the probability of observing $y_i = 0$ can be written as,

$$\Pr(y_i = 0|x_i, \beta) = F(-x_i'\beta) \qquad (6.6)$$

where F is a continuous, strictly increasing function that takes a real value and returns a value ranging from zero to one. The choice of the function F determines the type of binary model – Logit or Probit[24]. We use the same explanatory variables as in Section 6.4.2.

Such an approach is however, rather restrictive as it fails to fully capture the extent to which the adjustments to expenditure and revenue differ from one another. Therefore, in addition to estimating 6.4 we also estimate an ordered dependent variable model (ODV). The four different categories are outlined below. As before, we can apply either a Logit or Probit estimation technique to 6.7,

$$y_i = \mathbf{X}_i\mathbf{b} + v_i \qquad (6.7)$$

where,

: $y_i = 3$ if large -ve in adjusted expenditure and revenues either fall or 'stay the same' (where 'stay the same' is defined as <10% increase relative to expenditure adjustment),

: $y_i = 2$ if -ve in adjusted expenditure > +ve in adjusted revenue,

[24] Logit and Probit models are widely used in econometric applications, though less so in macroeconomics. The difference between the two models is based on the particular probability distribution function F adopted. While the former uses a logistic distribution function the latter is based on a cumulative normal one. The two distributions are similar except for the larger tails of the logistic distribution. On theoretical grounds, for this application, it is difficult to justify the choice of one instead of the other. In our analysis, the particular choice makes littler difference in terms of substantive results.

: $y_i = 1$ if +ve in adjusted revenue > -ve in adjusted expenditure and,

: $y_i = 0$ if large +ve in adjusted revenue and adjusted expenditures either increase or 'stay the same' (where 'stay the same' is defined as <10% decrease relative to revenue adjustment).

It is worthwhile to note that when estimating an ordered dependent variable model in effect one is creating a latent variable y_i^* that depends on the explanatory variables using the rule,

$$\begin{aligned} y_i &= 0 \; if \; y_i^* \le \gamma_1 \\ &= 1 \; if \; \gamma_1 < y_i^* \le \gamma_2 \\ &= 2 \; if \; \gamma_2 < y_i^* \le \gamma_3 \\ &= 3 \; if \; \gamma_3 < y_i^* \end{aligned} \qquad (6.8)$$

where, the limit points, γ_1, γ_2 and γ_3 are estimated at the same time as the β coefficients. It follows that the probabilities of observing a given value of y are given by –

$$\begin{aligned} \Pr(y_i = 0|x_i,\beta,\gamma) &= F(\gamma_1 - x_i'\beta) \\ \Pr(y_i = 1|x_i,\beta,\gamma) &= F(\gamma_2 - x_i'\beta) - F(\gamma_1 - x_i'\beta) \\ \Pr(y_i = 2|x_i,\beta,\gamma) &= F(\gamma_3 - x_i'\beta) - F(\gamma_2 - x_i'\beta) \\ \Pr(y_i = 3|x_i,\beta,\gamma) &= 1 - F(\gamma_3 - x_i'\beta) \end{aligned} \qquad (6.9)$$

As before, it is necessary to choose a function form for F. Again, the two most common are based on either a Logit or a Normal distribution.

One concern in the way in which this model is constructed is that there is likely to be an uneven distribution of observations in each category. We find that categories 2 and 1 have the greatest number of observations. An unbalanced number of observations in particular categories can serve to reduce the efficiency of our estimates. To address this point, and in addition to estimating the above ordered model, we have chosen to additionally obtain estimates using a reclassification of the groups in the above model so that an equal number of observations in groups 2 and 3 and in groups 1 and 0[25]. In what follows, we term this latter variant 2 and the former variant 1.

6.4.4 Explanatory Variables

Our explanatory variables are as follows. Firstly, to capture the impact of differences in decentralisation we include the two measures of decentralisation discussed in the previous section; Fiscal Decentralisation and Sub-Central Political Autonomy.

Secondly, in line with previous studies in the field, we test the significance of the 'type of government' at the centre, so we include two dummy variables[26]. Firstly, we include a dummy variable which discriminates between single party majority governments as oppose to coalition and minority governments. The dummy variable takes a value of 1 if the central government at the time of consolidation is formed by a

[25] We do this by ordering our consolidation attempts in terms of expenditure adjustment as a percentage of the adjustment in revenue and dividing the sample into four.
[26] We use Budge *et al.* (2000) to obtain the necessary political information to construct these dummy variables.

single party and has a legislative majority. It is anticipated that the parameter on this dummy variable will be negative, implying that the adjustment to expenditures (revenues) is larger (smaller) in single party majority governments. Secondly, we include a dummy variable which captures the ideological colour of the central government. The dummy variable in this instance takes the value of 1 if the party in power at the time of consolidation is classified as being left wing[27]. Previous studies have found conflicting evidence with regard to the sign and significance of this variable.

Thirdly, we include a number of 'economic' control variables in our estimation. Firstly, in line with Von Hagen *et al.* (2001), Ardagna (2004) and Purfield (2003), in order to account for the macroeconomic environment at the time of consolidation, we include both the value of the output gap in period T-1 and the change in monetary stance as measured by the change in the short-term real interest rate between T-1 and T[28]. It is possible that certain consolidation 'types' are more likely to occur under alternative macroeconomic conditions than others. For instance, it may be the case that tough expenditure reforms occur when output is high and/or monetary policy is loose etc. There is little empirical consensus on whether such factors ultimately influence the composition of a consolidation attempt[29]. We use lagged values of these variables to avoid problems of endogeneity – see Von Hagen *et al.* (2001).

[27] For each the central government is classified as left wing if the share of seats in government and supporting parties in Parliament controlled by parties which can are recognised to be left of centre on the political spectrum is greater than 66.6%.
[28] We also included the change in the real effective exchange rate but this was never significant in any specification so has been dropped from the results presented here.
[29] Both our output gap and short run real interest rate measures are taken from the OECD Statistical Compendium 2002 edition.

In addition, we account for the current fiscal policy climate at the time of consolidation, by considering both the level of debt in the year preceding the consolidation and the cumulative change in the fiscal surplus in the immediate run up to consolidation[30]. A number of authors, including Von Hagen *et al.* (2001) and Perotti (1999), have opined that consolidation attempts may be influenced by both the current fiscal policy position and previous years experiences.

In summary, our control variables are similar to that used in the existing literature. While the exact variables used may differ slightly (for example, lagged output gap as oppose to the lagged unemployment rate), we have attempted to follow the current literature as closely as possible. The primary additional variables in our analysis are the measures of decentralisation. This is an important development and enables us to test whether the level of decentralisation has an impact on consolidation attempts over and above alternative factors previously discussed in the literature.

6.4.5 Results

The results of our SUR/OLS estimation are presented alongside our results from the LDV analysis. Table 6.4 contains the results with our measure of fiscal decentralisation while Table 6.5, the measure of sub-central political autonomy[31]. For

[30] The initial debt measure is taken from the OECD Statistical Compendium 2002 edition while the measure of the cumulative change in the general government surplus is obtained from the IMF GFS database and our own calculations.

[31] In all our LDV models, the LR test statistic which tests the null hypothesis that all the slope coefficients are zero is rejected. In addition, we have tested for the presence of heteroscedastic residuals using the LM test advocated by Davidson and MacKinnon (1993). We find no evidence of heteroscedastic residuals.

our LDV analysis, the results presented in the following two tables are based on the use of a Logit model.

Table 6.4 Composition of Adjustment: SUR and LDV Estimates (Fiscal Decentralisation)

	Dependent Variable: % in Expenditure	Dependent Variable: % in Revenue	Type of Adjustment: Binary Model	Type of Adjustment: Ordered Model[32] Variant 1	Variant 2
C	-1.84**	1.74*	0.01	N.A.	N.A.
	(0.78)	(1.03)	(0.82)		
r_{T-1}	0.36***	-0.06	-0.10	-0.15	-0.13
	(0.13)	(0.17)	(0.13)	(0.10)	(0.10)
Output Gap_{T-1}	0.35***	0.63***	-0.31***	-0.26***	-0.25***
	(0.13)	(0.17)	(0.13)	(0.09)	(0.09)
$Debt_{T-1}$	0.00	0.00	0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.06)
Cumulative $Surplus_{T-2toT}$	0.05	-0.05	0.05	0.00	0.00
	(0.04)	(0.05)	(0.03)	(0.03)	(0.03)
Single/Maj $Govt_T$	-1.55**	-2.13***	1.64**	1.28***	1.43***
	(0.63)	(0.83)	(0.68)	(0.45)	(0.46)
Central Govt $Colour_T$	0.14	0.41	-1.01**	-0.46	-0.31
	(0.51)	(0.68)	(0.44)	(0.35)	(0.34)
Fiscal Decentralisation	0.03*	0.03	0.01	-0.02*	-0.02*
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)
Limit Points					
LIMIT 1C(8)				-1.70***	-1.04**
				(0.60)	(0.55)
LIMIT 2 C(9)				-0.05	-0.18
				(0.54)	(0.54)
LIMIT 3 C(10)				1.12**	0.84*
				(0.55)	(0.55)
R^2	0.45	0.31			
Adj. R^2	0.38	0.22			
Log-Likelihood			-24.76	-58.24	-64.21
Average Log-Likelihood			-0.43	-1.02	-1.13
S.E. of regression	1.82	2.41	0.41		
Sum of Squared Residuals	163.01	284.35	8.38		
D-W Statistic	1.60	2.65			
Restricted Log-Likelihood			-38.44	-73.81	-77.93
LR Statistic			26.95	31.15	27.43
Psuedo R^2				0.21	0.18

[32] Note that for an ordered model a constant is not reported. Instead we report the value of the Limit Points. It is possible to calculate marginal effects for each of the coefficients however, for our purposes it is sufficient to recognise the sign and significance of each coefficient.

Table 6.5 Composition of Adjustment: SUR and LDV Estimates (Sub-Central Political Autonomy)

	Dependent Variable: % in Expenditure	Dependent Variable: % in Revenue	Type of Adjustment: Binary Model	Type of Adjustment: Ordered Model	
				Variant 1	Variant 2
C	-2.15**	1.72*	0.09	N.A.	N.A.
	(0.89)	(1.09)	(0.90)		
r_{T-1}	0.39***	-0.04	-0.10	-0.17*	-0.15
	(0.13)	(0.17)	(0.13)	(0.10)	(0.10)
Output Gap_{T-1}	0.29**	0.61***	-0.31***	-0.27***	-0.26***
	(0.13)	(0.16)	(0.13)	(0.09)	(0.09)
$Debt_{T-1}$	-0.01	0.00	0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Cumulative $Surplus_{T-2toT}$	0.05	-0.06	0.05	0.01	0.01
	(0.04)	(0.05)	(0.03)	(0.03)	(0.03)
Single/Maj $Govt_T$	-1.16*	-1.78**	1.63**	1.06**	1.19***
	(0.63)	(0.80)	(0.69)	(0.43)	(0.43)
Central Govt $Colour_T$	0.42	0.53	-1.01**	-0.47	-0.32
	(0.20)	(0.26)	(0.44)	(0.35)	(0.34)
S-C Political Autonomy	0.37*	0.27	-0.02	-0.22*	-0.25*
	(0.52)	(0.66)	(0.20)	(0.13)	(0.13)
Limit Points					
LIMIT 1C(8)				-1.83***	-1.14*
				(0.65)	(0.61)
LIMIT 2 C(9)				-0.21	-0.29
				(0.60)	(0.60)
LIMIT 3 C(10)				0.96*	0.73
				(0.61)	(0.60)
R^2	0.41	0.30			
Adj. R^2	0.33	0.20			
Log-Likelihood			-24.76	-58.37	-64.49
Average Log-Likelihood			-0.43	-1.02	1.13
S.E. of regression	1.89	2.39	0.41		
Sum of Squared Residuals	182.03	291.34			
D-W Statistic	1.46	2.51			
Restricted Log-Likelihood			-38.44	-73.81	-77.93
LR Statistic			26.94	30.89	26.87
Psuedo R^2				0.21	0.17

The results in both Tables 6.4 and 6.5 are relatively consistent with each other. That is, variables which tend to generate large cuts in expenditure tend as one would expect to be associated with consolidation attempts that are relatively more expenditure than revenue based. Note that the results from our ordered model variants

are also consistent with one another suggesting that our results are not overly influenced by the construction of categorical groups. Any improvement in efficiency appears to be minimal.

We observe that the value of the output gap and the change in the short run real interest rate, are the only two significant 'economic' control variables. The positive coefficient on the output gap for both the change in expenditure and revenue in our SUR, suggests that a healthier macroeconomic position tends to lead to consolidation attempts that involve larger increases in national revenue and smaller cuts to expenditure. This inference is also supported by our LDV variable estimation where the significantly negative coefficient demonstrates that larger (positive) output gaps in the period preceding consolidation lead to a higher probability of a consolidation attempt being skewed toward increases in revenue as opposed to cuts in expenditure[33]. The positive coefficient on the change in the interest rate for the expenditure equation, implies that a tightening of the monetary stance tends to reduce the size of the expenditure adjustment. This also emphasises that expenditure adjustments are more likely to occur when the Central Bank is following an expansionary policy. However, the monetary stance coefficient is insignificant in our limited dependent variable analysis. Thus it would appear that the output gap is the single most important economic determinant of the relative composition of a consolidation attempt.

The fiscal position as measured by the debt and the cumulative change in the surplus, appears to have little impact on the size of the adjustment either to adjusted

[33] A similar result is found in Mulas-Granados (2002) though using a measure of unemployment instead of the output gap.

expenditure or revenue. This is consistent with Mulas-Granados (2002) who while adopting a slightly different estimation approach and measurement of the initial fiscal position concludes that the fiscal balance in the run up to consolidation is an insignificant determinant of whether a consolidation attempt is likely to be more expenditure or revenue based.

From Tables 6.4 and 6.5 there is clear evidence that the type of government matters. Our results show that single party majority central governments tend to undertake larger cuts in adjusted expenditure and smaller increases in adjusted revenue during consolidation attempts, than their coalition or minority government counterparts. The results from our LDV analysis support this. The significantly positive coefficients in both the binary and ordered models implies that single party majority governments are more likely to base their consolidation attempts on adjustments to expenditure rather than revenue. This result is consistent with the previous research in this field e.g. Alesina *et al.* (1998), however we have been able to demonstrate that this effect is significant even accounting for economic controls.

Interestingly, we find no significant evidence that the size of either the expenditure or revenue adjustments during consolidations is determined by the political ideology of the central government[34]. The signs of the coefficients in both our approaches would suggest that left-wing governments are less likely to make substantial cuts to expenditure than their centre or right-wing counterparts. In most instances however, they are insignificant. Only in the binary model case is the

[34] The dummy variable for ideological colour while positive is statistically insignificant.

coefficient significant. This result is consistent with that reported in Mulas-Granados (2002) who uses a similar binary model.

Our main focus however, is on our measures of decentralisation. Significance in either direction would imply that the size of the adjustments to either expenditure or revenue (and hence the composition of the consolidation attempt) are influenced by the extent of decentralisation within countries, the evidence on this is of borderline significance. Specifically, our measures of decentralisation are significantly positive at the 8 and 7 percent levels of significance for the size of the adjustment to expenditure[35]. They are insignificant for our revenue equation. Thus the evidence tentatively suggests that the size of the overall adjustment to expenditure was smaller in countries with greater levels of decentralisation than in the more centralised countries. The results from our ordered dependent variable model also lend support to this inference. The significantly negative coefficients (all be it at the 10% level) imply that, in countries with higher degrees of decentralisation, the composition of the adjustment was more likely to be skewed toward revenue increases as oppose to expenditure cuts. It is possible to interpret these exploratory results as providing evidence that decentralisation may (by presumably leading to increased fragmentation in the setting of budgets) curtail the extent of any adjustment to expenditure during consolidation attempts. This result is consistent with our discussion in Section 6.2.

In summary, we have offered a first insight into whether the level of decentralisation impacts on the composition of a consolidation attempt. As we have argued above, by increasing fragmentation in the budgetary process and given the

[35] Upon elimination of the most insignificant control variables, both measures of sub-central autonomy are significant at the 5% level.

substantial vertical imbalances that exist in most countries, it is possible that consolidation attempts in countries with highly autonomous sub-central governments are more likely to favour adjustments to national revenue as oppose to expenditure. Our evidence, within limitations, does suggest that this may be the case.

6.4.6 Fiscal Impulse

In addition to examining the impact of political factors on the composition of consolidation attempts, we can also test whether or not these factors impact on the size of the consolidation itself. In this section we present some results based on a simple OLS regression of the size of the general government fiscal impulse on our explanatory variables discussed above. Our results are contained in Table 6.6.

Table 6.6: Fiscal Impulse OLS Regressions

	Dependent Variable: Size of General Government Fiscal Impulse	
	Fiscal Decentralisation	Political Autonomy
C	2.53***	2.96***
	(0.48)	(0.50)
r_{T-1}	-0.24***	-0.25***
	(0.08)	(0.08)
Output Gap_{T-1}	0.04	0.04
	(0.08)	(0.07)
$Debt_{T-1}$	0.00	0.00
	(0.01)	(0.00)
Cumulative $Surplus_{T-2toT}$	-0.06***	-0.06***
	(0.02)	(0.02)
Single/Maj $Govt_T$	-0.66*	-0.70*
	(0.38)	(0.36)
Central Govt $Colour_T$	-0.11	-0.15
	(0.31)	(0.30)
Fiscal Decentralisation	0.00	
	(0.01)	
S-C Political Autonomy		-0.17
		(0.12)
R^2	0.30	0.33
Adj. R^2	0.20	0.23
S.E. of regression	1.03	1.01
Sum of Squared Residuals	51.66	49.63
D-W Statistic	1.64	1.62
F-stat p-value	0.01	0.01

In contrast to our results on composition, the size of the cumulative surplus appears to be an important factor in determining whether a consolidation attempt is large or small. Consolidation attempts that have followed periods of improvement in the primary balance tend to be smaller than consolidations taking place in the aftermath of a weaker fiscal position. This is unsurprising, as any return to 'trend' fiscal policy will require a fiscal expansion if the position had been deteriorating in the immediate past. Note however that, in this instance, the political variables are for the most part insignificant. Only the type of government variable is significant and even then only at the 10% level. While political variables appear to be important in determining the composition of consolidation attempts, they appear to have little influence on the actual size of the adjustment.

6.5 Decentralisation and Success

In Section 6.4 we have discussed the impact of decentralisation on the composition and size of consolidation attempts. As a final empirical test, it is sensible to examine directly whether or not decentralisation impacts on success. As demonstrated, there is some evidence to suggest that greater levels of decentralisation tend to reduce the size of the expenditure adjustment, with a greater reliance on revenues. We now test whether this observation is sufficient to generate less successful attempts.

To test the impact of decentralisation on the probability of success we again apply limited dependent variable analysis (LDV)[36]. Our first model we estimate is a binary Logit/Probit model based upon the definitions of success and failure outlined in Chapter 2 Definition 2:

$$y_i = \mathbf{X}_i\mathbf{b} + v_i \qquad (6.4)$$

where,

: $y_i = 1$ if consolidation is deemed successful and,

: $y_i = 0$ if consolidation is deemed unsuccessful.

Our use of a binary dependent variable model which discriminates between successful and unsuccessful consolidations follows Purfield (2003). However, our

[36] Binary limited dependent variable models have been used previously in the context of fiscal consolidation attempts – see for example, Von Hagen *et al.* (2001), Purfield (2003), Annet (2002), EC (2003) and Alesina and Ardagna (1998).

analysis differs in that we have chosen to focus upon industrialised as oppose to transitional countries and in addition we include political variables, such as the type of government and the degree of decentralisation in addition to economic controls. Alesina and Ardagna (1998) adopt a similar binary estimation approach however, they fail to include a full list of control variables and choose instead to limit their analysis of the factors which contribute to successful as oppose to unsuccessful consolidation attempts to the size and composition of such an adjustment.

Von Hagen *et al.* (2001) and to a lesser extent Ardagna (2004) also make use of binary dependent variables in their analysis of consolidation attempts however, they make use of the entire sample and not just the periods of consolidation. The difficulty with such an approach is that with the small number of consolidation attempts relative to the entire sample, the limited dependent variable estimation can lack efficiency. Furthermore, our explicit focus in on the determining the factors between successful and unsuccessful consolidations and therefore, we feel it is appropriate to limit our discussion to these two groups of observations.

In a further extension to the literature, we estimate an ordered dependent variable model (ODV) but on this occasion using the success index outlined in Definition 3 in Chapter 2:

$$y_i = \mathbf{X}_i\mathbf{b} + v_i \qquad (6.5)$$

where,

: $y_i = 3$ if SI = 3,

i.e. if the debt to GDP ratio falls by at least 5 percentage points in the three years following consolidation.

: $y_i = 2$ if SI = 2,

i.e. if the debt to GDP ratio stabilises (within half a percentage point tolerance of the initial level rate) or if it decreases by less than 5 percentage points over the three years following consolidation.

: $y_i = 1$ if SI = 1

i.e. if the growth rate of debt to GDP ratio over the three years following consolidation is less than that observed in the three years prior to consolidation (here we use a tolerance of 10% of the initial growth rate).

: $y_i = 0$ if SI = 0.

i.e. if none of the above apply.

Once more we believe that the use of an ordered model in this context is justified as it better captures differences in the relative successes of our observed consolidation attempts.

As before, the same explanatory variables are used and hence our 'controls' are very similar to that of Von Hagen *et al.* (2002) and Purfield (2003). Note however, unlike Von Hagen *et al.* (2001) and Purfield (2003) we do not include as explanatory variables either the size of the adjustment or the composition. Our hypothesis, and that of the political economy literature, is that political factors skew the composition and/or limit the size of consolidation attempts so that they are less likely to be successful. Consequently, it is inappropriate to include both political variables and the

size and composition of the consolidation in the same regression as both will in effect test the same hypothesis. We assume therefore, that there is a clear casual relationship between the political economy factors and the type of consolidation undertaken and hence on success. Accordingly, we do not include both the size and the composition of consolidations in the **X** matrix[37]. As before our results do not alter substantively according to whether a Logit or Probit model is adopted. The results presented in Table 6.7 have been obtained using a Logit model.

[37] We have experimented with including the composition and size of consolidation in the same regression as the political economy measures. As expected, in most instances, the political economy variables are insignificant and results are available on request. Ardagna (2004) includes both composition and political economy measures including ideology and type of government in a similar though not identical binary model of success. This study also finds that for the most part, the relevant political economy measures are insignificant.

Table 6.7: Decentralisation and Success

	Binary Dependent Variable: 1 = Success, 0 = Failure		Ordered Dependent Variable: Success Index	
	Fiscal Decentralisation	Political Autonomy	Fiscal Decentralisation	Political Autonomy
C	-1.58**	-1.15		
	(0.71)	(0.77)		
r_{T-1}	-0.06	-0.07	-0.12	-0.15
	(0.11)	(0.11)	(0.13)	(0.14)
Output Gap_{T-1}	-0.25**	-0.25**	-0.45***	-0.47***
	(0.12)	(0.12)	(0.16)	(0.16)
$Debt_{T-1}$	0.01	0.01	0.03**	0.02**
	(0.01)	(0.01)	(0.01)	(0.01)
Cumulative $Surplus_{T-2toT}$	0.09**	0.09**	0.15	0.15***
	(0.04)	(0.04)	(0.05)	(0.05)
Single/Maj $Govt_T$	1.08**	1.06**	1.73**	1.70**
	(0.53)	(0.53)	(0.78)	(0.77)
Central Govt $Colour_T$	0.70	0.66	1.58**	1.59**
	(0.45)	(0.45)	(0.66)	(0.67)
Fiscal Decentralisation	0.00	N.A.	-0.01	N.A.
	(0.01)		(0.02)	
S-C Political Autonomy	N.A.	-0.18	N.A.	-0.46**
		(0.17)		(0.24)
Limit Points				
LIMIT 1C(8)			0.93	-0.10
			(1.05)	(1.09)
LIMIT 2 C(9)			2.83***	1.94*
			(1.10)	(1.10)
LIMIT 3 C(10)			3.82***	2.99***
			(1.13)	(1.13)
Log-Likelihood	-29.28	-28.72	-62.18	-60.30
Average Log-Likelihood	-0.51	-0.50	-1.09	-1.06
S.E. of regression	0.44	0.44		
Sum of Squared Residuals	9.68	9.48		
Restricted Log-Likelihood			-76.11	-76.11
LR Statistic	16.45	17.58	27.86	31.60
Psuedo R^2			0.18	0.21

Our results highlight the factors which contribute to the success or failure of consolidation attempts. Firstly and somewhat surprisingly, we find strong evidence to suggest that consolidation attempts that take place during macroeconomic downturns

(i.e. negative output gap), are more likely to be successful than those that take place during macroeconomic upturns. Our measure of the output gap in period T-1 is statistically significantly negative in both our Binary and Ordered Success models and across both measures of decentralisation (i.e. larger (more positive) output gaps reduce the probability of a consolidation being successful). This may reflect the substantial impact on expectations of consolidation attempts being conducted in periods of lower output. Added to this, the results from the previous section demonstrated that expenditure adjustments are more likely to occur in periods of low output gaps. Similar results tend to be found elsewhere. For example, EC (2003) find that expansionary fiscal consolidations tend to follow periods of poor macroeconomic performance and our results may reflect this.

In contrast, we find no evidence to suggest that the stance of monetary policy impacts on the probability of success. This result contrasts with that of Alesina and Ardagna (1998) and Ardagna (2004) which find limited evidence that expansionary monetary policy can assist the chances of success. This is however, disputed elsewhere (see for example Purfield (2002)).

In line with Obstfeld (1998), Ardagna (2004) and Perotti (1999) we find that initial fiscal conditions appear important, all be it in only some of our estimations. The results from our ordered model show that consolidation attempts that take place when the debt to GDP ratio is high have a high probability of being successful – see Table 6.7[38]. However, our results also show that successful consolidations typically follow periods of improvement in the fiscal balance as highlighted by the significantly

[38] This result only holds for the ordered models, as in the binary models the $Debt_{t-1}$ variable, while positive is insignificant.

positive coefficient on the cumulative fiscal impulse variable. This suggests that successful consolidations appear to be part of more prolonged periods of fiscal improvement. As observed in our analysis in Chapter 3, in many instances successful consolidations occur in close proximity to other consolidation attempts. These two results are also found in Ardagna (2004).

In line with the established literature we find strong evidence to support the claim that single party majority governments have a higher probability of implementing a successful consolidation than their coalition or minority counterparts – see Alesina and Perotti (1995), Alesina *et al.* (1998). However, in an extension to their analysis we are able to show that this result holds even when one accounts for economic controls. This result is entirely consistent with our results in Section 6.4, which demonstrated that such governments typically made substantial cuts to expenditure and altered national revenue to a lesser extent.

Interestingly, we find strong evidence that left wing governments have a significantly higher probability of being successful than those of the right or centre. This is consistent with Alesina *et al.* (1998). But when taken with our earlier analysis, is difficult to explain. As we demonstrated in Section 6.4, our analysis of the composition and size of consolidation attempts showed no significant difference between left-wing and centre/right governments. In fact in the case of our Binary model, the evidence is that left-wing governments are more likely to increase revenues. As we have shown throughout this thesis, revenue based adjustments tend to be less successful than those which are expenditure based. Therefore, there appears to be an apparent inconsistency between our two results (and between the results of

Alesina *et al.* (1998) and Mulas Grandos (2002)). One explanation for this might be lack of degrees of freedom but it is also possible that it may reflect the different impact on private sector expectations of a consolidation implemented by a left wing versus a right wing government. It is possible that any consolidation attempt undertaken by a left-wing government (even if the majority of the adjustment is on revenues but where expenditures are still cut) has a significant impact on the private sector who might expect them to be more fiscally profligate. Thus, revenue adjustments without a substantial increase in expenditure may still have a significant positive impact when instigated by a left-wing government. Note however, that this result also appears to be heavily influenced by the construction of the dummy variables for 'type of government'. If we re-construct our measure of type of government to discriminate between governments with a majority and those with a minority in the legislature, the ideology dummy is insignificant. Thus we should not be overly concerned about the apparent inconsistency[39].

Finally and most importantly, we find little evidence to suggest that decentralisation impacts directly on the potential of a consolidation being successful. While our measure of sub-central political autonomy is significant in our ordered model, our measure of fiscal decentralisation is insignificant in both the binary and ordered models. Therefore, our evidence suggests that decentralisation, while influencing the composition of adjustment at the margin, is not sufficient to constrain a country's ability to consolidate successfully. We conclude that countries with

[39] There is also a question regarding the accuracy of our measure of ideological colour. For example, most political commentators would draw a clear distinction between the current labour government (classified as left-wing) and other left-wing governments of the past. For an improved measure of ideology and changes over time which unfortunately does not include all countries in our sample see Darby *et al.* (2004).

relatively high levels of decentralisation appear just as able as other countries to implement a successful consolidation.

This final result is important as it offers a first test of the hypothesis that decentralisation may lead to greater macroeconomic difficulties. Our results for the most part, would suggest that countries with the highest levels of decentralisation are not necessarily less likely to implement a successful consolidation attempt. We should however, be aware of the tentative nature of our results and our analysis is a first pass at this issue. Further research is clearly warranted.

6.6 Options for Improved Measures of Decentralisation

While our measures of decentralisation are we believe an improvement on previous studies even then, they do not provide a 100% accurate measure of the level of decentralisation and the scope for political fragmentation between tiers of government within particular countries. We believe therefore, that continued research in this field is warranted and perhaps with future improvements in data availability the concepts and issues discussed in this chapter can be reassessed.

We believe that the two measures we have constructed, 'Fiscal Decentralisation' and 'Sub-Central Political Autonomy' provide good approximations of the levels of sub-central fiscal and political responsibility across our sample countries. However, these two concepts, fiscal and political decentralisation, are not mutually exclusive. For instance, high levels of fiscal control may matter little if the

centre can challenge the authority of the sub-centre. Similarly, high levels of political autonomy are of little use if few resources are transferred to sub-central tiers. We have included an interactive measure of fiscal and political decentralisation by multiplying the two values assigned to 'Fiscal Decentralisation' and 'Sub-Central Political Autonomy' by one another. The resultant interaction variable was statistically insignificant. However, such a simple arbitrary approach may not fully capture any interactions and a more sophisticated approach may yield a different conclusion.

Our above measure of fiscal decentralisation does not account for differences in borrowing autonomy. If a sub-central tier can borrow, this can significantly increase their level of de facto control over their own expenditure levels. For example, in response to cuts in inter-governmental transfers and if the sub-centre is able to borrow, it can continue to offer the public services currently provided. The difficulty with inserting a measure of borrowing autonomy in the analysis is that information is relatively limited. We have however, used the Rodden (2003) borrowing autonomy index in the analysis conducted above and the variable is insignificant. Nevertheless, we acknowledge that a fully accurate measure of fiscal decentralisation should account for differences in borrowing autonomy and that the importance of borrowing freedom is likely to be heavily dependent on interactions with other decentralisation variables such as revenue autonomy, expenditure decentralisation, and political autonomy.

While we have improved on previous studies by focussing on the size of sub-central expenditures in excess of grant finance and hence captured the degree of central control via the financing of sub-central expenditure, we have not accounted for

the extent of central government directives over these expenditures. As discussed in Chapter 1, if the centre can alter guidelines, targets and so forth for sub-central expenditure provision, they can retain a substantial degree of de facto control over such expenditures even if the sub-centre raises the revenue to finance these expenditures – see Pola (1999) and Ebel and Yilmaz (2002). Unfortunately, information on the use of directives across countries is relatively limited. To date, the only formal study of their use has been in OECD (2001) and is limited to only six transitional countries.

However in mitigation, in the context of a consolidation attempt the relevance of central control via directives may be relatively limited. Directives are often used to enforce minimum standards and hence *increases* in sub-central expenditure above levels which the centre deems to be too low, typically in health and education. In contrast, during a consolidation attempt the centre is likely to want *cuts* in expenditure. The effectiveness of directives in such a scenario is likely to be more limited. Nevertheless, an accurate account of the use of directives can assist in obtaining a complete and comprehensive measure of the degree of effective decentralisation within a country. While information across the entire sample range is likely to be unavailable, measures for more recent years should be able to be obtained with careful examination of individual country sources. One option is to adopt a similar survey approach to the OECD (2001) study but to extend the scope to a wider group of countries.

While we have been able to account for the existence of tax sharing arrangements in our sample, and thereby, improve significantly on many previous

studies of fiscal decentralisation, our measure is not complete. Firstly, our source fails to provide the necessary information on two of our countries Australia and France. Secondly, the data is cross sectional and therefore, there is the potential for imposing financing regimes across our entire sample which are only correct for one particular year. In addition, it is possible that the de-classification of the tax revenues received by sub-central units into effectively four different groups is not detailed enough. A related point is that in order to obtain a single unit measurement of sub-central tax autonomy it is possible that erroneous horizontal aggregation is applied. This is particularly the case for countries which have chosen an asymmetric path to decentralisation. Thirdly, in many countries even when the sub-centre appears free to set the tax rate and the tax base, substantial central government interference can still exist. For example, according to OECD (1999) UK local governments are able to set their council tax rates autonomously. While this is the case in theory, in practice the central government retains the right to 'cap' the tax rates of local governments if they deem such rates to be excessive. Therefore, the de facto control of local governments in the UK to freely set their own tax rates is more limited than the OECD (1999) study suggests. The data provided in the OECD (1999) study does however, provide a useful approximation of the degree of sub-central taxation autonomy across our sample. In addition, from individual case studies of decentralisation arrangements within particular countries, we are reasonably confident that for most countries the degree of taxation autonomy has remained relatively constant over the years. It is encouraging to observe that recent studies such as that by Stegarescu (2004) are seeking to build on and improve the current information on sub-central taxation autonomy.

Finally, while not an actual measurement of decentralisation but an important factor in determining the scope for political fragmentation between tiers of government, is the existence of institutional structures which aim to reconcile any policy differences between central and sub-central tiers of government. A number of countries have attempted to circumvent the associated conflicting preferences and/or political motivations, by introducing a variety of co-ordination arrangements designed to facilitate a common fiscal policy strategy across tiers. In such a framework, policy makers can discuss the wisdom and implications of alternative fiscal strategies before reaching an 'agreed' position on the most appropriate form of action. Such institutional bodies tend to be most evident in federal countries such as the Premiers' Conference and the Loan Council in Australia and the Financial Planning Council in Germany. However in practice, the effective power of these institutional arrangements, especially during periods of significant policy conflicts can be questionable, see IMF (1997). The main role of these institutions is to prevent any fragmentation between tiers during times of fiscal stress or other instances of required adjustment. It is possible that the existence of such institutions actually encourages successful consolidation attempts even in a system of high levels of fiscal decentralisation. It may also be the case however, that such institutions are in reality an irrelevance. Obtaining the necessary information is likely to be challenging and requires careful research.

I hope to address some of these issues in future post-doctoral studies. Despite these issues of measurement, the research undertaken in this chapter we believe retains a great deal of significance and relevance. We are confident that our measures of sub-central decentralisation in improving upon those adopted in previous studies,

provide a useful approximation of the relative fiscal and political strengths of sub-central units across our sample countries. While improvements in measurement are possible we are confident that our classification of countries according to their degree of decentralisation will not alter to any great extent.

6.7 Conclusion

In this chapter we have outlined a number of ways in which decentralisation can have an impact on the consolidation process. Political economy theory suggests that by increasing the number of players in the budgetary process, decentralisation may reduce the likelihood of a successful consolidation being implemented.

We have tested this hypothesis both directly and indirectly. In the first instance, we found marginal evidence to suggest that decentralisation impacts on the composition of a consolidation attempt. Consolidation attempts that took place in countries with higher levels of fiscal decentralisation or sub-central autonomy tended to rely heavily upon revenue increases as opposed to expenditure cuts. Our measures of decentralisation were however, significant only at the 10% level. This result was consistent across both our SUR and LDV analysis. We found no evidence that decentralisation has an impact on the size of a consolidation attempt.

From this, we then proceeded to test directly whether decentralisation was a significant determinant of our identified successful consolidation attempts. While the coefficients on our two measures of decentralisation were negative, in the majority of

cases they are insignificant. We can therefore, tentatively conclude that there is little significant evidence to support the hypothesis that decentralisation harms the consolidation process.

As discussed, our measures of sub-central decentralisation provide a useful and improved comparative benchmark of the degree of decentralisation within countries. However, we recognise that as an approximation our measures do not capture all aspects of decentralisation or the scope for fragmentation between tiers. In the penultimate section of this chapter we have outlined a number of potential avenues for improvement and the difficulties involved in obtaining the required additional information.

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Conclusions

A number of important issues have been analysed in this thesis. Primarily our focus has been on the role of sub-central governments during national consolidation attempts. Our research has also focussed on the behaviour of sub-central governments in response to cuts in their grant allocations together with a discussion of differences in the level of central control over sub-central governments under alternative financing regimes. A key conclusion emerging from this research is that the distinct contribution of sub-central tiers in national fiscal management cannot be readily dismissed. While we acknowledge that in many cases it is convenient to view national fiscal policy as being controlled by a single entity, we argue that such an assumption is not always appropriate.

The core of the original contribution of this thesis is contained in Chapters 1, 3, 4, 5 and 6. Key findings and areas for future research are summarised below.

Fiscal Decentralisation: A Discussion of the Literature and Cross-Country Experiences

In Chapter 1 we compared and contrasted the levels and forms of fiscal decentralisation in fifteen OECD countries (Australia, Austria, Belgium, Canada,

Denmark, Finland, France, Germany, Ireland, the Netherlands, Norway, Spain, Sweden, UK and the USA).

We observed that across our sample, sub-central governments play a significant role in the conduct of national fiscal policy. In all these countries, substantial amounts of expenditure and revenue are assigned to State, Regional and Local tiers of government. This is unsurprising given that the virtues of decentralisation, such as improvements in allocative efficiency, voter participation and restrictions on profligate governments have been well documented. We do however observe, that substantial heterogeneity exists between countries both in terms of their actual level of decentralisation (as measured by the percentage of national expenditures and revenues assigned to sub-central tiers), and in the elements of fiscal policy assigned to sub-central tiers. For instance, we observed that across our sample and using the latest available data, expenditure decentralisation ranges from just under 25% to just over 50% of total government expenditure. However, in an interesting result we found that the apparent differences between federal and unitary countries are more apparent than real. For example, many unitary countries, including the Scandinavian nations, have devolved large amounts of fiscal responsibility to sub-central tiers.

A key observation was the existence of a substantial vertical imbalance throughout our sample with sub-central expenditures greatly exceeding sub-central revenues. As we observed in later chapters, this gap and the grants used to fill it, play a key role in intergovernmental relations.

An issue discussed at length in Chapter 1 and in Chapter 6 was the attainment of accurate measures of fiscal decentralisation. In this thesis, our primary data source was the IMF's Government Financial Statistics. This is an excellent source of data on sub-central fiscal policy and provides a wide range of internationally comparable data not only on expenditure, revenue and deficit 'aggregates', but on disaggregate elements of expenditure and revenue such as breakdowns by economic function and type. In using this dataset, combined with supplementary sources including measures of tax and borrowing autonomy, we are confident that our analysis of sub-central governments and their degree of 'autonomy' is relatively accurate.

We recognise however, that full knowledge of issues such as taxation autonomy, expenditure guidelines and intergovernmental policy forums is not yet possible. A key goal for future research is to continue to make improvements in measurement and information on these issues.

Fiscal Consolidation and Fiscal Decentralisation: A Tale of Two Tiers

Having outlined our methodology to identify consolidation attempts and to measure their success in Chapter 2, in Chapter 3 we began our empirical analysis by undertaking a descriptive analysis of consolidation attempts both at the national level and at the sub-central level. In doing so, we followed the approach of a number of key researchers in the field such as Alesina, Perotti and a variety of co-authors, by measuring the average adjustments in key fiscal policy variables during consolidation episodes. The advantage of adopting this descriptive approach is the ability to obtain

a clear picture of key trends in the data during consolidations, together with differences in these trends during successful and unsuccessful attempts. Our novel contribution has been to apply this approach to both central and sub-central government data so that during a national consolidation attempt the individual contributions of each tier and the interactions between the two could be analysed. In previous studies the focus has been limited to general government data, with the implicit assumption that the central government is entirely responsible for all changes in general government fiscal policy. In addition, by extending this analysis to focus upon episodes when sub-central governments consolidate, we have undertaken the first cross-national study of the adjustment behaviour of sub-central tires.

In Chapter 3 we demonstrated that most successful national consolidation attempts have involved concerted adjustments by both central and sub-central tiers. This is a key result. We observed that sub-central tiers of government are actively involved in national consolidations and assist the central government during such periods. We verified that successful general government consolidations tend to be based upon expenditure cuts as opposed to increases in revenue and in a new observation we demonstrated that the sub-central tier is crucial in achieving such cuts. This is especially critical with regard to the government wage bill. Throughout the consolidation literature to date, cuts to the government wage bill have been widely supported for their ability to have both long-lasting effects on the public purse and to potentially generate expansionary non-Keynesian output effects. In an interesting result we have been able to show that a large proportion of these cuts have stemmed from the sub-central tier and therefore and we have advocated that future attempts at

consolidation should be aware of the importance of making cuts to the sub-central wage bill.

In addition, a key observation was made on the role of intergovernmental grants during national consolidation attempts. We observed that cuts in central to sub-central grants were made during successful consolidation attempts but that during unsuccessful attempts these grants altered little. We believe this to be an important result which previous studies, by ignoring the separation of central and sub-central fiscal policy, have not been able to identify. We suggested that these cuts have acted as a visible signal of the central government's intention to consolidate and have 'forced the hand' of the sub-centre. Given their typically limited alternative sources of revenues, even marginal changes in grants can have a major impact on expenditure. This result provided the motivation for our further research into grants and the response of sub-central governments in subsequent chapters of this thesis.

In the final section of Chapter 3 we examined how sub-central tiers adjusted during 'lone' consolidation attempts. Interestingly, in an analogous result to our general government study we found that those sub-central consolidations which focused upon expenditure cuts, tended to generate longer-term improvements in sub-central balances than those based upon revenue increases. An apparent downside of this, is the observation that a large proportion of the adjustment to sub-central expenditures is often borne by capital rather than current expenditure. We concluded that this phenomenon may have long-term implications for local service provision.

While this descriptive analysis revealed a number of interesting results, a limitation of this approach was the restricted focus on the actual period of consolidation. Little is known of the behaviour of fiscal policy in the immediately surrounding periods. Interesting unexplored questions included whether our identified consolidations were sustained and/or whether they occurred in the aftermath of a deterioration in the fiscal position etc. The challenge was to find a methodology which would allow us to continue with a clear descriptive approach but one that would enable us to examine changes in fiscal policy before, during and after a consolidation attempt. Previous studies of fiscal consolidations have tended to ignore the periods surrounding consolidation or have offered only brief and somewhat ad hoc comment. We believe that without an accurate and systematic analysis of the periods immediately prior to and following consolidation attempts, a complete picture of the common features of successful and unsuccessful attempts cannot be obtained.

Fiscal Federalism, Fiscal Consolidations and Cuts in Central Government Grants: Evidence from an Event Study

In Chapter 4 we addressed this issue by outlining a new methodological approach that would allow examination of fiscal policy behaviour across a number of periods and not just during the year of consolidation. We constructed an event study in which we compared and contrasted changes in fiscal behaviour across an 'event window' with that in 'normal' or reference years. While the methodology we adopted has been previously applied in the Finance literature, we believe that its use in the context of fiscal consolidation is novel.

In addition to re-examining the behaviour of central and sub-central governments during national consolidation attempts, we also extended our focus to examine the behaviour of sub-central governments in response to cuts in their grant allocations. The adjustments made by sub-central governments during such episodes has attracted widespread attention in the literature but the existing analysis has been limited to single country case studies, primarily on US data. The difficulty with such studies is that their application to countries with a lesser degree of decentralisation is limited. Applying our event study analysis to cuts in intergovernmental grants enabled us to conduct as far as we aware, the first cross-country empirical examination of the response of sub-central governments to cuts in their grant allocations. We were also able to group countries according to their differing degree of decentralisation and hence present and discuss results that are of greater relevance to a broad spectrum of countries.

The results from this chapter re-affirmed our belief of the importance of sub-central governments during national fiscal adjustments. For example, the evidence presented here demonstrated the large and sustained adjustments to expenditure and revenues that sub-central governments undertook during successful national consolidation attempts. In an extension to our analysis in Chapter 3 (and in the literature in general), an actual time profile of the adjustments before, during and after the period of consolidation was obtained. The importance of grants was further emphasised with the observation that successful consolidations typically involved large *and sustained* cuts in intergovernmental grants.

A number of key results emerged from our examination of cuts in grant allocations. We observed that in response to grant cuts, sub-central governments typically responded by cutting their expenditures. In addition, the largest cuts in sub-central expenditure in response to grant cuts seemed to have occurred in countries with the greatest expenditure decentralisation. This implies that, even within countries which have a high degree of decentralisation, grant allocations provide an important mechanism through which central governments can retain considerable effective control over sub-central expenditures. Interestingly, in contrast to studies on US data, we have found that cuts in grants are not generally offset by increases in sub-central taxation revenues. While there was some evidence of a temporary increase, this effect was not sustained. Finally, consistent with our discussions in Chapter 3, we observed that capital spending has been an important adjustment mechanism for sub-central governments – a result that holds during national consolidation attempts *and* following cuts in grants.

Assessing the Degree of Central Government Effective Control: Grants versus Tax sharing

In Chapter 5 we changed tack slightly and discussed the important issue of central control over sub-central government finance. It has become increasingly popular in the literature to view sub-central revenues received from grants and tax-sharing arrangements as equivalent, given the limited control that sub-central tiers have over the actual amount of revenue they ultimately receive. If the centre controls the tax base and rate over the shared taxation, the amount of revenue the sub-centre

receives is in fact controlled by the centre, even though in accounting terms, such revenues are classified as sub-central 'own-source'.

In this chapter however, we demonstrated that under the most common form of tax sharing regime where the tax shares assigned to each tier are either i) fixed by the constitution or ii) fixed by some mutually agreed formula that requires the consent of both tiers before it can be altered, or iii) where the sub-centre is permitted to set a tax within a certain band, the degree of effective central control over sub-central fiscal policy is substantially lower than under a system of grant finance. The reason for this is relatively simple but it has in our view, been widely overlooked. Under grant finance the central government can drive a wedge between the resources they intend to raise for sub-central expenditures and what they actually transfer to the sub-centre in any given fiscal year. In contrast, under the tax sharing regimes that are common in most countries, such as Austria, Germany and many Scandinavian countries, this is not possible. In such a scenario while it is possible for the central government to alter the actual level of sub-central expenditure, they are required to adjust sub-central revenue allocations in a manner that erodes any potential improvement in the fiscal deficit/surplus. In short, we demonstrated that under the most common form of tax sharing, the centre is unable to 'force a consolidation' on the sub-central tier unlike under a system of grant finance.

This conclusion has important policy implications for countries such as the UK and its devolved territories, which are actively contemplating switching from grant finance to tax sharing regimes (or vice versa). In the future, it would be interesting to focus on the behaviour of sub-central governments to changes in the

revenues received from their tax sharing allocations and to compare and contrast this with their responsiveness to changes in grants.

The Impact of Decentralisation on National Consolidation Attempts

In the 6th and final chapter of the thesis we tested directly whether the extent of decentralisation within a country has impacted on the nature of a consolidation attempt and ultimately whether it has enhanced or hindered a country's ability to consolidate successfully.

A substantial political economy literature has developed focussing on fiscal consolidation attempts and has concluded that political factors such as fragmentation and ideology can be important determinants of when and how a consolidation actually takes place and whether or not it is ultimately successful. A key hypothesis is that fragmentation during the setting of the budget can lead to a consolidation attempt that is skewed toward the less 'sensitive' elements of fiscal policy such as revenue and capital expenditure. Consequently, by failing to address the key areas of social transfers, the government wage bill and government expenditure more generally, this reduces the probability of success.

This literature has however, ignored the practical implications of fiscal policy being conducted by a number of distinct tiers of government. The only sources of fragmentation which previous studies have tested, lie within the central tier. While it is possible that decentralisation may assist the consolidation process, one would

expect that fragmenting fiscal policy conduct over a number of government units, which may or may not share the same economic preferences and political motivations, will result in successful consolidation becoming more difficult in highly decentralised countries. The aim of Chapter 6 was to test this hypothesis.

At the outset, it was necessary to obtain an accurate measure of sub-central decentralisation. To do this, we constructed two measures; one based on the level of fiscal decentralisation and the other on the level of sub-central autonomy. Previous empirical studies of the impact of decentralisation on economic outcomes have tended to use either measures of fiscal or political decentralisation, therefore we constructed measures of both. We believe our measure of fiscal decentralisation is an improvement on previous measures in that we accounted for the way in which sub-central expenditures are financed, while recognising the important difference between grants and tax sharing highlighted in Chapter 5. Likewise, we believe our measure of sub-central political autonomy is an improvement on the standard Federal vs. Unitary distinction as account has been taken of other 'political/federal' factors such as the explicit rights of sub-central tiers and the degree of regional representation at the central level.

To undertake our empirical examination we adopted a number of alternative procedures. For the most part, our main estimation techniques were to employ various Limited Dependent Variable models. While the use of binary limited dependent variable models have been used previously in the context of fiscal consolidations, our use of an ordered model was, to the best of our knowledge, unique. We believe that

the ordered model is preferred as this allows more appropriate distinctions to be made between the various consolidation attempts.

Our empirical results are mixed. We found some evidence to suggest that those countries with greater levels of decentralisation have biased their consolidation attempts toward increases in revenue and away from cuts in expenditure. However, they tend not to be significantly less likely to implement a successful consolidation than countries with lower levels of decentralisation. These results are a first pass at this issue and in the future, with fuller information on the levels and forms of decentralisation and the existence of inter-governmental policy institutions, a re-examination of such issues can be undertaken.

General Areas for Future Research

The issues of political fragmentation between tiers and of how conflicts develop and are resolved, are important areas for future research. For example, it would be interesting to examine whether fragmentation is more likely to exist and be of concern when governments of differing ideological colour are in power at different tiers. It is possible that co-partisanship may allow the centre to force fiscal discipline on certain sub-central units in order to protect the national value of the party label, but that other governments may be far less willing to respond. Given data considerations, such analysis would probably have to be restricted to individual country studies. Nevertheless, important political economy questions and their resolution could be analysed.

On a cross-national basis there is clear scope for improvements in information on sub-central fiscal policy. This is one of the clear goals for future analysis of fiscal decentralisation. As discussed above, while the measures we have available provide good approximations of fiscal and political autonomy, there are important gaps which need to be addressed. Obtaining the necessary information is likely to require careful research but attainment of improved measures such as the extent of sub-central taxation autonomy, the extent of centrally imposed guidelines, sub-central budgetary institutions and so forth is fertile ground for future studies. It would, for example, be interesting to examine the extent to which targets and guidelines impact on the behaviour of sub-central governments and whether this leads to uniformity in service provision. This is an area of research I wish to advance in post-doctoral studies.